

THE HAWAIIAN PLANTERS' RECORD

OCT 1947



The Akaka Falls, Hilo Forest Reserve
Island of Hawaii

FIRST QUARTER 1947

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THE HAWAIIAN PLANTERS' RECORD

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A quarterly paper devoted to the sugar interests of Hawaii and issued by the Experiment Station for circulation among the plantations of the Hawaiian Sugar Planters' Association.

Twenty-five Years of Forestry Work on the Island of Hawaii

AVAILABLE
FOR REVIEWING

By L. W. BRYAN

L. W. Bryan, Forester on the Island of Hawaii for the Board of Agriculture and Forestry, presents in the following article a comprehensive review of the forestry work accomplished on that island by the Division of Forestry and private enterprise. The period under review has been a critical one in the reestablishment and rehabilitation of important watersheds there. This report on the work accomplished by Mr. Bryan and his associates shows that adequate returns have been obtained for the monies which have been so freely appropriated by the Territory of Hawaii, the Federal government and private interests.

The Board of Commissioners of Agriculture and Forestry believes that the sugar industry and others will be interested in the work of their government in protecting this natural resource which is of such vital consequence to their welfare and well being. Moreover, the sugar industry on that island has shown its keen support of this project through direct financial assistance and strong, enthusiastic support of all policies relating to the preservation and protection of essential watersheds. We are indeed happy, therefore, that the Experiment Station, H.S.P.A., feels that the facts recorded in this article are of great importance and will publish them in The Hawaiian Planters' Record.

COLIN G. LENNON, President
Board of Agriculture and Forestry.

FOREWORD

In this report I have attempted to cover all of the forestry work accomplished on the Island of Hawaii during the twenty-five-year period July 1, 1921, to June 30, 1946. In compiling these data I have drawn on all available sources and have attempted to include all the work accomplished by all interested agencies, although some of the records of work accomplished by certain agencies during the early part of this period are not complete.

The writer first came to Hawaii early in July 1921, and found that a considerable amount of forestry work had already been accomplished. The framework of the present forest reserve system had been laid, areas had been set aside and the work of marking out the reserve boundaries on the ground was then being started. At that time there were seventeen officially proclaimed Forest Reserves, with a total of 457,981 acres of land, of which 376,854 acres were Government owned, and 81,127 acres were privately owned. During this twenty-five years the system has grown until there are today twenty-six Forest Reserves containing 129,149 acres of privately owned lands and 452,662 acres of Government lands or a total of 581,811 acres set aside on this Island. The oldest reserve is the Hilo Reserve, established in 1905, while the most recent is the Kaupulehu Reserve, established in 1932.

Tree planting had been carried on in different sections of this Island. Early in the 1890's David Haughs (who later became the first Territorial Forester and was for many years Territorial Forest Nurseryman) conducted extensive tree-planting experiments in the Kau District, where he was employed by the Hutchinson Sugar Plantation Company. Of the genus *Pinus* alone, he planted out over 100 different species. David McH. Forbes was another early Forester who did considerable planting in the Hamakua District. Working as a Forester for the Pacific Sugar Mill Company, he made the first commercial planting of *Cinchona* in the Kukuiahae Forest during the later part of the last century. Dr. B. D. Bond of Kohala also added to the exotic flora of this Island and there are others who, over fifty or more years ago, did considerable conservation work here.

Some forest fencing had been accomplished. A forest-fire system had been established by an Act of the Legislature in 1905, and it was working efficiently. District Foresters, who served without pay, had been appointed and were doing excellent work. Such men as the late James Webster, John M. Ross, John T. Moir, James Campsie and David Forbes, as well as many others, gave freely of their time to the cause of forestry and, when I arrived in 1921, much had already been done toward the establishment, rehabilitation, preservation, extension, and protection of the forests on Hawaii.

ORGANIZATION

Forestry work on Hawaii is organized under one head (the Island Forester with headquarters in Hilo) who is assisted in his duties by an Assistant Forester. Ranger Districts have been established covering the entire Island, with a Ranger in charge of each of the six districts. Each Ranger is responsible for the proper patrol and care of the Reserves in his District. Our principal nursery is located in Hilo with nurserymen and laborers employed in the propagation and distribution of plants. These laborers are, at seasonable times, used in the field to plant and

care for trees, construct fences, maintain trails, and do other necessary work. Other laborers are employed from time to time on a temporary basis to perform specific tasks as the need arises and as funds permit. On plantation-owned lands, plantation laborers are used for tree planting and other forestry work and, at times, the number of men so engaged and work accomplished have been considerable. The Hawaiian Sugar Planters' Association Forest Unit 1 (Kohala), and Forest Unit 3 (Hilo) have been responsible for a large share of the forestry work accomplished in these two Reserve areas. Unit 3 through its Nauhi Gulch Station has been able to demonstrate that certain temperate-zone trees do well at higher elevations.

FENCES

The first step, after a reserve has been set aside and marked out on the ground,



Fig. 1. Standard forest fence. There are over 300 miles of fences protecting the Forest Reserves on the Island of Hawaii. This one is located in the Hilo Reserve, Land of Kaumana, and was built by the C.C.C.

is to construct necessary fences on all boundaries exposed to stock. For cattle and horses we use one type of fence, and for goats, sheep and hogs, a different type. Our Reserve boundaries are presently protected from trespass from stock by a

total of 306 miles of fence. All of this fence must be constantly patrolled, repaired, and rebuilt as needed. A considerable portion of this fence-patrol work must be done on foot as it is constructed over terrain too rough to use other means of transportation. Actually, 89 miles or 29 per cent of the total distance must be gone over on foot; the remaining 217 miles may be patrolled on horseback. Fence posts are cut locally wherever possible, using the best material available. *Mamani kiauwe*, and *ohia* are considered among the best trees for this purpose. In medium-wet locations, large *ohia* posts will last from ten to twelve years; on the mountain, in the dry sections, matured *mamani* has remained sound for thirty years, and in very wet locations, posts are comparatively short-lived and *ohia* lasts usually from five to six years. Considerable experimental work has been accomplished in the treatment of fence posts with preservatives. Results obtained indicate that the life of a fence post can be prolonged by the proper use of certain chemicals. The following tabulation shows the fence work accomplished during the period under consideration:

Reserves	New Fence Miles	Rebuilt Fence* Miles	Repaired Fence** Miles	Totals
Hilo Reserve	44.38	22.54	29.02	95.94
Manowaialee Reserve	2.57	4.32	6.15	13.04
Hamakua Reserve	29.80	17.92	18.44	66.16
Kohala Reserve	14.01	20.10	27.13	61.24
Kaupulehu Reserve	4.02	0.13	.....	4.15
Honuaula Reserve	1.25	7.46	3.83	12.54
Waiaha Spring Reserve	2.10	4.32	5.24	11.66
Kahaluu Reserve	.....	0.97	.....	0.97
South Kona Reserve	8.26	7.46	0.04	15.76
Kau Reserve	28.46	4.68	6.66	39.80
Kapapala Reserve	.....	2.85	.....	2.85
Kilauea Reserve	.....	9.77	.....	9.77
Upper Olaa Reserve	.....	.....	0.38	0.38
Olaa Reserve	11.83	10.61	17.04	39.48
Olaa Forest Park Reserve	4.51	9.45	20.08	34.04
Mauna Kea Reserve	62.89	0.51	11.11	74.51
Waiakea Reserve	0.73	2.76	1.13	4.62
Puna Reserve	0.46	3.11	.....	3.57
Nanawale Reserve	0.01	.....	.....	0.01
Totals	215.28	128.96	146.25	490.49

*A rebuilt fence is a fence where 50 per cent or more of the posts are replaced.

**A repaired fence is a fence where less than 50 per cent of the posts are replaced.

ANIMALS

After an area has been fenced, the next step is to attempt to remove all cattle, horses, pigs, goats, and sheep, wild or otherwise, from the reserve area. In some cases it has been possible to drive out the tame and semi-wild cattle and horses and, in other cases, it has been necessary to shoot them. Organized drives have been held and many thousands of wild goats and sheep have been captured in this manner. The hunting of these animals has been encouraged and over five thousand permits have been issued for this purpose. Occasionally a break occurs in our fence line caused by fallen trees, heavy rains, etc., and stock gains admittance. These animals are promptly removed and necessary repairs are made to the fence.



Fig. 2. Wild sheep captured in a drive near Puu Nanaha, Mauna Kea. Many thousands of these animals have been captured and destroyed in this way.

During the period under consideration, a total of 1,871 cattle and other tame animals has been removed, and in the following tabulation the kind, location, and number of animals killed are shown. This total of 257,028 gives us an average of over 10,000 animals killed per year.

Reserves	Pigs	Goats	Sheep	Cattle	Horses	Dogs	Donkeys	Totals
Hilo	4,331	453	....	108	..	..	..	4,892
Manowaialee	27	....	....	...	..	..	..	27
Hamakua	73	....	....	...	..	..	..	73
Kohala	1,311	172	....	4	..	..	..	1,487
Kaupulehu	149	1,251	87	...	..	..	..	1,487
Honuaula	393	1,393	210	4	..	..	..	2,000
Waiaha Spring	16	9	....	...	..	..	..	25
Kahaluu	21	....	....	...	..	..	..	21
Honaunau	148	3	....	...	..	..	..	151
South Kona	2,803	14,982	2	6	..	..	69	17,862
Kau	1,019	789	....	168	..	..	..	1,976
Kapapala	2	14	....	1	..	..	..	17
Upper Olaa	5	....	....	...	..	..	..	5
Olaa	4,579	2,296	....	8	..	..	..	6,883
Upper Waiakea	....	8	....	...	..	..	..	8
Mauna Kea	1,447	797	46,765	23	13	..	..	49,045
Waiakea	4,776	2,835	....	3	..	..	..	7,614
Puna	776	220	....	...	..	..	..	996
Keauohana	3	1	....	...	..	..	..	4
Misc. Reserves	3,191	4,412	....	108	..	..	..	7,711
Totals	25,070	29,635	47,064	433	13	0	69	102,284
Adjacent to								
Forest Reserve	24,761	104,916	24,404	305	5	65	288	154,744
Grand Totals	49,831	134,551	71,468	738	18	65	357	257,028



Fig. 3. Wild goat drive in the Puna District. These animals are not nearly as plentiful as formerly.



Fig. 4. A section of the Mauna Kea Reserve at 8,000 feet showing the effects of over grazing by wild sheep. It will be noted that there is very little grass and no natural reproduction of the native *mamani*.



Fig. 5. Another section of the Mauna Kea Reserve at 8,000 feet. This area has been fenced for a number of years and protected from wild sheep damage. Note young trees and high grass.

TREES

Tree planting was started in 1921, has been continued and, as shown by the following tabulation, a total of 4,082,928 trees has been planted out within our Forest Reserves. Of this amount approximately 75 per cent or three million trees have been planted by the Territory, C. W. A., C. C. C., etc., and 25 per cent or one million trees have been planted within forest reserves by plantations and others. In addition to this, there have been 5,651,977 trees planted by individual plantations, ranches, and others on their own property outside of the reserve area, making a grand total of 9,734,905 trees planted during this twenty-five year period.

Reserve	Trees	Reserve	Trees
Hilo	1,571,808	Upper Olaa	184
Manowaialee	109,177	Olaa	28,696
Hamakua	1,311,165	Olaa Forest Park..	61,737
Kohala	636,432	Upper Waiakea ...	94
Honuaula	156,333	Mauna Kea	13,028
Waiaha Spring ...	47,982	Waiakea	38,276
Honaunau	6,802	Panaewa	5,250
South Kona	839	Keauohana	4,806
Kau	58,423	Malama Ki	8,198
Kapapala	263	Nanawale	23,435
		<hr/>	
		TOTAL	4,082,928

In addition to the above planting, over five tons of seeds have been planted as shown in the following table:

Reserves	Pounds Seed
Hilo Reserve	212
Hamakua Reserve	182
Kohala Reserve	16
Kaupulehu Reserve	1,110
South Kona Reserve	4,192
Kapapala Reserve	1
Mauna Kea Reserve	4,229
Waiakea Reserve	25
Panaewa Reserve	802
Keauohana Reserve	23
Malama Ki	122
Nanawale	33
<hr/>	
TOTAL	10,947

At the start very little was known regarding the species of trees best suited to a given area. Naturally mistakes were made until, through trial and error, we discovered the right species to plant in the different areas. In order to assist us in obtaining these necessary data, a number of arboreta were established under dif-

ferent climatic conditions within and adjacent to our reserve. In these arboreta we caused to be planted 1,057 different species of plants, a few of each species for trial. Recently a survey has been conducted and a check made of all species growing in twenty-two arboreta. Growth measurements have been made and each species has been graded and classified as to vigor, appearance, reproductive ability, freedom from disease and insects, etc. A consolidation of the results obtained has been prepared and from this report there has been compiled a list of all species that we consider worthy of further trial in one or more locations. These species are contained in two lists and are reproduced herein. The results obtained from these experimental plantings, together with additional work accomplished in the field, now make it possible for us to determine with a reasonable degree of success just what to plant in any given area.

In addition to the above, considerable experimental work has been conducted with fruit trees, and a total of seven experimental fruit orchards containing 597 varieties of fruit-bearing trees has been established under different climatic conditions in various sections of this Island. A careful check has recently been made of all varieties planted, a consolidation of the results obtained has been prepared, and



Fig. 6. Hilo Nursery where we have produced and shipped 8,089,917 trees.

from this report there has been compiled a list of all varieties that have done well in one or more locations. Although this work is far from being complete, we feel that we are now in a favorable position to recommend certain varieties for certain planting sites.

Of as much, if not of greater importance, is the work of maintaining young trees already planted. Grass and weeds grow so rapidly that, unless follow-up work is done, many of the young trees soon become covered over and mortality is high. In most of our planting areas, it has been necessary to clean each plantation of trees at least twice in order to permit them to get their heads above the grass and weeds and to reach a size sufficiently large to care for themselves. Actual mortality counts have been made in the past and, over a period of several years,

the percentage of survivals was found to be over ninety. Actual accomplishments under this heading are listed herewith:

	Trees	Acres
Hilo Reserve	3,143,616	7,227
Manowaiale Reserve	248,416	527
Hamakua Reserve	2,281,192	5,039
Kohala Reserve	1,272,864	2,928
Honuaula Reserve	312,666	719
Waiaha Spring	95,964	221
South Kona Reserve	1,689	12
Kau Reserve	116,846	368
Olaa Reserve	115,190	220
Olaa Forest Park Reserve	93,782	209
Mauna Kea Reserve	2,130	4
Waiakea Reserve	76,552	180
Panaewa Reserve	95,485	437
Kaauohana Reserve	9,612	9
Nanawale Reserve	68,821	698
Honaunau Reserve	13,604	32
Totals	7,948,429	18,830



Fig. 7. Hilo Nursery Annex where good varieties of fruit trees are raised and grafted. Large tree in the background is *Albizzia moluccana*, 18 years old, 110 feet high, 123 feet spread of branches, and a trunk diameter of 6 feet.

In order to supply trees for our planting work, it has been necessary to establish and operate several nurseries. Our principal nursery is located in Hilo. This nursery was established more than thirty years ago, and has furnished many thousands of young trees, not only for forest planting, but also for plantations, ranches, farmers, homesteaders, household owners and others for various purposes. The effects of this distribution of plants on this community can now be observed, for ornamental, fruit, and timber trees, furnished by this nursery during the past years, are a common sight. It has been a worth-while project and of benefit to the entire Island.

During the period under consideration, a total of over ten thousand lots of seeds and cuttings was propagated at the Hilo Nursery. In addition to the Hilo Nursery, other nurseries have been established at strategic points, as required by our planting operations, and several plantations and ranches have established and continue to operate their own nurseries in order to produce planting material for their own needs. As a matter of record, the following tabulation shows our nursery production and distribution.

YEARS	Hilo Nursery	Honomu Nursery	Amauulu Nursery	Nauhi Nursery	Puukapu Nursery	Keanakolu Nursery	Totals
1921-22	92,542	.....	.....	.....	.....	...	92,542
1922-23	59,431	.....	.....	.....	.....	...	59,431
1923-24	112,800	.....	8,025	.....	.....	...	120,825
1924-25	162,982	18,506	33,465	.....	.....	...	214,953
1925-26	195,244	22,667	26,460	.....	.....	...	244,371
1926-27	328,329	26,015	26,370	3,159	.....	...	383,873
1927-28	248,262	8,415	26,865	2,409	.....	...	285,951
1928-29	241,485	7,565	.....	4,447	.....	...	253,497
1929-30	274,081	.....	.....	4,951	.....	...	279,032
1930-31	270,677	.....	.....	2,685	.....	...	273,362
1931-32	373,168	.....	.....	4,319	.....	...	377,487
1932-33	371,701	.....	.....	2,985	.....	...	374,686
1933-34	481,271	.....	.....	21,037	.....	...	502,308
1934-35	473,728	.....	.....	2,513	.....	...	476,241
1935-36	1,113,766	.....	.....	9,086	.....	...	1,122,852
1936-37	515,822	.....	.....	3,551	.....	...	519,373
1937-38	519,527	.....	.....	15,092	.....	...	534,619
1938-39	681,773	.....	.....	8,235	2,025	...	692,033
1939-40	529,900	.....	.....	8,574	24,161	...	562,635
1940-41	361,515	.....	.....	4,099	50,898	...	416,512
1941-42	283,074	.....	.....	.....	2,978	...	286,052
1942-43	243,921	.....	.....	.....	.....	154	244,075
1943-44	39,704	.....	.....	.....	.....	623	40,327
1944-45	52,749	.....	.....	.....	.....	...	52,749
1945-46	62,465	.....	.....	.....	.....	...	62,465
TOTALS*	8,089,917	83,168	121,185	97,142	80,062	777	8,472,251

*Includes vegetable plants distributed during the war years.

Considerable attention has been paid to Arbor Day on the Island of Hawaii in order to encourage tree planting and to make the average person tree-minded. Arbor Day is usually celebrated during the month of November, and the following



Fig. 8. Keanakolu sub-nursery at 5,200 feet elevation. Temperate-zone fruit and other trees are handled here.

figures indicate the distribution made on that day during the past twenty-five years:

Year	Plants	Year	Plants
1921	2,000	1934	11,467
1922	1,917	1935	8,828
1923	3,966	1936	20,099
1924	9,260	1937	24,367
1925	16,000	1938	22,237
1926	12,639	1939	22,783
1927	22,000	1940	24,109
1928	14,136	1941	22,986
1929	33,306	1942	30,000
1930	44,489	1943	4,042
1931	29,000	1944	6,692
1932	23,404	1945	7,056
1933	21,037		
		TOTAL	437,820

FOREST FIRES

The Island of Hawaii is divided into thirty-four Forest Fire Warden Districts, each in charge of a District Fire Warden and their activities are directed by a Deputy Forest Fire Warden who is the Island Forester. These District Fire Wardens are outstanding citizens (usually plantation or ranch managers) who reside within their Districts, serve without pay, and are responsible for enforcing forest-fire laws, issuing burning permits, preventing, suppressing and controlling of all fires within their Districts. These public-spirited citizens have done excellent work and it is due to their efforts that the number of fires, occurring on this

Island, have been kept to a minimum. The following table lists all of the fires reported during the past twenty-five years:

Year	Fires	Year	Fires	Year	Fires
1921-22	3	1930-31	2	1939-40	6
1922-23	0	1931-32	2	1940-41	1
1923-24	2	1932-33	0	1941-42	1
1924-25	1	1933-34	6	1942-43	0
1925-26	6	1934-35	0	1943-44	7
1926-27	3	1935-36	4	1944-45	6
1927-28	3	1936-37	0	1945-46	0
1928-29	3	1937-38	1	—	—
1929-30	4	1938-39	0	Total	61

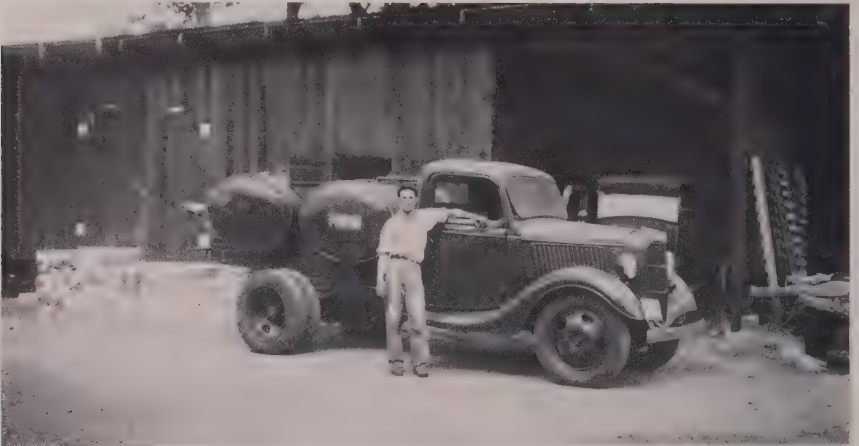


Fig. 9. Forest fire truck. This vehicle is kept at the Hilo Nursery in constant readiness. Personnel stationed there are trained to respond promptly in case of fire, and fire drills are held periodically. This truck is also used to spray poison along our firebreaks.



Fig. 10. Indian fire pump in operation. These knapsack pumps hold 5 gallons of water and are constructed with a built-in pump as part of the handle. They are capable of throwing a 30-foot stream of water and are most useful in combating forest fires.

At the Hilo Nursery, fire-fighting equipment consisting of pumps, water tanks, hoes, fire truck, water hose, axes, rakes, etc., are kept in a constant state of readiness and personnel stationed there have been trained in the use of this equipment and to respond quickly in case of need. Periodic fire drills are held and all equipment is frequently inspected to insure its being in good operating condition. During extremely dry spells, patrols are operated in outlying isolated sections to watch for and control any fires.

To assist us in our fire-control work we have constructed and continue to maintain ten miles of firebreak in the Hilo District.

UNEMPLOYMENT RELIEF WORK

Beginning in July 1933, when due to the depression we were forced to lay off practically our entire force of personnel, certain unemployment relief funds were made available for forestry work on this Island, and this form of cooperation was continued to the beginning of the war in December 1941. Labor, material, and supplies were provided by several different agencies, the principal one being the Civilian Conservation Corps. During the period April 1, 1934 to November 30, 1941, this agency made possible the accomplishment of a large amount of good work which otherwise might have been impossible. In addition to the fact that this type of work furnished good, healthy, full-time, out-of-door employment to hundreds of young men, assisted in their education, improved their health, and brought needed money into the community, the C.C.C. actually accomplished the following work:

Planting, Forestation—acres [*]	8,086.17
Planting, Forestation (Maintenance)—acres	12,400.52
Horse Trail (Construction)—miles	191.26
Horse Trail (Maintenance)—miles	156.65
Truck Trail (Construction)—miles	92.72
Truck Trail (Maintenance)—miles	114.45
Foot Trail (Construction)—miles .....	.10
Fire Break (Construction)—miles	8.20
Fire Break (Maintenance)—miles	61.00
Fence (Construction)—miles	112.87
Fence (Rebuilt)—miles	2.18
Fence (Maintenance)—miles	5.52
Telephone Line (Construction)—miles	51.20
Tree Seed Collection pounds	58,853
Wild Animals Killed	27,219
Eradication of Exotic Plants—acres	19.1
Buildings Constructed	13
Cattle Guards Constructed	2
Nursery, Produced and Shipped—trees	4,400,410
Camps, Constructed	10
Enrollees—Inducted	936
Number of Man-Days Expended on Work Projects	253,373
Bridges — Foot	1

^{*}Includes 5,000 lbs. of mamani seed broadcast on approximately 2,500 acres.

RECREATION

On the mainland, within the National and many of the State Forest Reserves, recreation is one of the important uses to which the reserve areas are put. Here in Hawaii, where water conservation is our principal concern, the areas available

for this purpose are limited. However, we have been able to accomplish some work along these lines as shown in the following eight paragraphs:



Fig. 11. Kanakaleonui Ranger Station. One of our standard ranger stations of which there are several located in the Reserves on this Island



Fig. 12. Public camp ground and shelter with tank located in the land of Manuka, South Kona Reserve. This camp is frequently used by goat and pig hunters.

1. In 1922 a start was made along these lines when we established the Akaka Falls Park near Honomu and within the Hilo Forest Reserve. This park is built around the Akaka Falls (in Kolehale Gulch) which has a sheer drop of 418 feet. These falls are the highest on the Hilo coast and compare favorably with waterfalls found elsewhere. Since the establishment of this area, additional work has been accomplished, a new shelter has been built, bridges and trails constructed, many species of plants added, the parking lot enlarged, and the area developed into a very popular park, not only for our local people, but as a tourist attraction. The

County of Hawaii cooperates with us to the extent of furnishing a full-time park keeper who looks after this area.

2. When the Kapapala Reserve was set aside in 1930, we inherited an old camp site located at Halewai on the ancient Ainapo-Mauna Loa trail. This camp has been renovated to provide an overnight camp site for parties climbing Mauna Loa from the southeast side. It is located at 7,750 feet near the upper limits of timber growth and consists of two small, three-sided shelters with a water tank and animal corral. The trail leading to it and on up the mountain was rebuilt by the C.C.C. about ten years ago. This trail offers the shortest approach to Mokuaweoweo Crater.

3. In 1935 a three-sided stone rest house containing a fireplace for outdoor cooking together with a water tank and comfort station was constructed at Manuka in the South Kona Reserve using C.W.A. labor. This camp is used by around-the-Island parties as a stopping place for lunch and also as an overnight camp by pig and goat hunters who assist us in the eradication of these animals within the adjacent reserve areas.



Fig. 13. Intake at the Hopukani Springs located at over 10,000 feet on Mauna Kea. Water supply for our Pohakuloa Camp is piped from this spring, which has a daily flow of about 14,000 gallons.

4. In 1936 a single-room stone rest house, Halepohaku, was constructed by the C.C.C. at 9,500 feet elevation within the Mauna Kea Forest Reserve and, in 1939, an additional stone building containing three rooms was built adjacent thereto. A truck trail was constructed to this area and necessary water tanks were installed and a comfort station erected. We now have accommodations for fifty-seven people and it has proved a very popular camping area, particularly during the winter months when there is usually snow on the mountain. A small charge is made for the use of this camp in order to make it self-sustaining.

5. In 1936 in the Puna District, Malama-Ki Reserve near the seacoast, we constructed a shelter, water tank, and comfort station using C.C.C. labor and material. Later on, in 1938, we named this area McKenzie Park in honor of

Forest Ranger, A. J. W. McKenzie, who was killed in June 1938 while on duty. This area is very popular as an overnight camp for fishermen and is used as a picnic area by parties who visit the Puna District.

6. In the Upper Olaa Reserve near the base of Puu Kulani, we maintain a small shelter for the use of pig hunters who assist us in the eradication of these animals in this section. This shelter and connecting six-mile trail were constructed by the C.C.C. during 1936.

7. During the period when the C.C.C. was active, an addition was constructed to our Honuaula Ranger Station located at 6,500 feet on the west slope of Hualalai. This building, which contains a built-in stove and kitchen and has an ample water



Fig. 14. Pohakuloa Hunting Lodge. This is the latest addition to our recreation facilities. Accommodations are available here for 25 people. First priority is given to those who desire to hunt wild pigs, goats, and sheep, which are plentiful in this area.



Fig. 15. Party of hunters from Pohakuloa Hunting Lodge.

supply, is available for parties ascending Hualalai.

8. At 6,500 feet elevation within the Mauna Kea Forest Reserve, we have recently completed the restoration of part of the old C.C.C. Camp, and have established a hunting lodge where accommodations are available for approximately twenty-five people. Priority in the use of this Camp is given to those interested in the hunting of wild pigs, goats, and sheep. These animals are very plentiful in the adjacent Reserve where they do considerable damage to forest growth, and it is hoped that a considerable reduction can be made in their numbers through this means of encouraging hunting and providing a place for the hunters to stay. A charge is made for accommodations furnished so that this Camp may be self-sustaining.

CONSTRUCTION

Considerable construction work has been required in order to advance our forestry program. Nursery buildings and benches, ranger stations, C.C.C. camps, etc., have been built as required, and necessary maintenance work has been performed as needed. We now operate and maintain twenty Ranger Stations, eight recreational areas, and four nurseries.

TRAILS

To reach our reserve areas, planting sites, fence construction projects, recreational areas, etc., it has been necessary to construct and maintain several different types of trails. Work accomplished under this heading is shown below:

Reserve	Foot Const.	Trail Miles Maint.	Horse Const.	Trail Miles Maint.	Truck Const.	Trail Miles Maint.
Hilo	16.70	6.80	35.37	71.41	1.00	1.84
Manowaialee	..	..	2.50	3.98	..	..
Hamakua	..	..	..	18.93	5.05	0.03
Kohala	6.78	..	9.85	35.55	1.00	..
Kaupulehu	..	..	3.88	..	..	..
Honuaula	..	..	4.00	17.98	..	..
Holualoa	..	..	..	2.23	..	..
Waiakea Spring	3.82	..	0.75	2.80	..	..
South Kona	..	..	12.00	19.14	2.50	..
Kau	..	0.27	17.95	0.19	..	..
Mauna Kea	0.10	..	62.43	5.06	84.52	104.18
Nanawale	..	..	..	..	2.89	13.20
Totals	27.40	7.07	148.73	177.27	96.96	119.25

TELEPHONE LINES

Communication with some of our outlying stations has been established by constructing and maintaining a number of telephone lines. These lines are of the single-wire, ground-circuit type, usually strung on locally cut poles where available, although a number of miles of line have been built using discarded two-inch water pipe in places where wooden poles were not obtainable. Actual accomplishment is shown below:

	Miles
Hilo Reserve	17.35
Mauna Kea Reserve	19.00
Kau Reserve	18.20
Honuaula Reserve	6.75
Total	61.30

RAINFALL AND TEMPERATURE RECORDS

We maintain a total of nineteen rain gauges and seven temperature-recording stations on the Island of Hawaii. The first gauge was established at Nauhi Gulch in January 1925, and the latest gauge was established at Halepohaku in September 1939. Some of these gauges are read daily, some once a month and two of them, Punaluu-Kahawai and Muliwai (due to their extreme isolation) are read once every quarter. Our gauges are located from 35 feet to 9,500 feet above sea level and under various climatic conditions. Our greatest average annual rainfall (287.80 inches) was registered at Makahanaloa gauge No. 2, located at 2,750 feet within the Hilo Reserve directly mauka of Pepeekeo. The lowest average rainfall (7.54 inches) was recorded at Pohakuloa gauge located at 6,500 feet within the Mauna Kea Reserve. The lowest temperature recorded (26° F.) was at Nauhi Gulch at 5,100 feet in the Hilo Forest Reserve.

Experimental Tree Planting

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Acer rubrum</i>	—	—	F —	Scarlet maple—very valuable tree for street and park planting in the temperate zone.
<i>Adina cordifolia</i> PI 123454	F	—	—	Large handsome, deciduous tree from India. Wood seasons well and takes a good polish.
<i>Agathis robusta</i>	G	—	—	Kauri gum—broad-leaved conifer from Australia; good timber.
<i>Agonis flexuosa</i> FPI 81505	F	—	—	Tree from Australia with willow-like leaves.
<i>Ailanthus glandulosa</i>	F	—	—	Chinese tree of Heaven.
<i>Alangium meyeri</i>	G	—	—	Tree grown for its handsome foliage.
<i>Albizzia acle</i>	G	—	—	Small tree doing fairly well.
<i>Albizzia moluccana</i>	E	—	—	One of the fastest growing trees attaining a large size.
<i>Albizzia odoratissima</i>	G	—	—	A large shade tree, spreading in habit — India.
<i>Albizzia procera</i>	F	—	—	Tall handsome tree from India — brown heartwood is used for making tools.
<i>Albizzia sassa</i>	F	—	—	Large handsome tree from tropical Africa.
<i>Albizzia stipulata</i>	E	—	—	Tall tree from tropical Asia. Rapid in growth.
<i>Albizzia versicolor</i>	F	—	—	Leguminous tree—not doing well.
<i>Aleurites fordii</i>	G	—	—	Source of tung oil.
<i>Aleurites moluccana</i>	F	—	—	The <i>kukui</i> tree with maple-like leaf.
<i>Aleurites trisperma</i>	F+	—	—	Banucalog—tree endemic to the Philippines.
<i>Allamanda nerifolia</i>	F+	—	—	Bush Allamanda—shrub 3 to 4 feet high with yellow funnel-shaped flowers.



Fig. 16. *Alnus nepalensis* (Nepal alder) growing in very wet location along Upper Hamakua Ditch, Kohala Reserve.

Location	Vigor
1 — Low elevation (0 to 2500 feet)	E — Excellent
2 — Medium elevation (2500 to 6000 feet)	G — Good P — Poor
3 — High elevation (over 6000 feet)	F — Fair D — Dead

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Alnus nepalensis</i>	G	G	—	Excellent tree for very wet locality.
<i>Alnus rubrum</i>	—	—	E	Red alder—Alaska to Idaho and California.
<i>Alocasia portei</i>	F	—	—	Philippine Ape—Ape with deeply incised leaves. Ornamental.
<i>Amoora grandiflora</i>	G	—	—	Ornamental—medium-size.
<i>Amoora rohituka</i>	F+	—	—	Hingul—moderate-sized tree of Ceylon, India, etc. Oil from seed used for lighting.
<i>Anacardium occidentale</i>	G	—	—	Cashew nut tree.
<i>Andira inermis</i>	F	—	—	Cabbage Angelin—bastard mahogany of the West Indies. Used for wind belts.
<i>Anona glabra</i>	G	—	—	Mangrove Annona—likes swampy places. Fruit large, smooth skin, yellow when ripe; not palatable.
<i>Anona laurifolia</i>	F+	—	—	Synonymous with the above.
<i>Anona montana</i>	G	—	—	Mountain soursop—large roundish fruit, turning yellowish when ripe; not palatable.
<i>Antidesma bunius</i>	F	—	—	Nigger's cord—medium-sized tree with dark green foliage and small acid edible berries. Makes good wine.
<i>Aphelandra</i> sp. P 6254	F	—	—	Shrub grown for the fine foliage and showy flowers.
<i>Araucaria cookii</i>	G	—	—	Tall tree, very much like <i>Araucaria ezelsa</i> .
<i>Araucaria cunninghamii</i>	F	—	—	Valuable timber tree from Australia.
<i>Araucaria ezelsa</i>	E	—	—	Norfolk Island pine—tree reaching 200 feet in its native habitat. Timber used for ship building.
<i>Ardisia humilis</i>	F	—	—	Ornamental shrub, good as pot plant in juvenile stage.
<i>Argyroxiphium macrocephalum</i>	—	—	G	Silver sword.
<i>Artocarpus incisa</i>	G	—	—	Breadfruit—fruit eaten cooked.
<i>Azalea</i> sp.	G	—	—	Beautiful flowering shrub suited to cool climate.
<i>Bambusa</i> sp. P 5081	G	—	—	Small-type bamboo with odd stems, each node broader at base and tapering towards the top.
<i>Bambusa</i> sp. (yellow)	G	—	—	Green-striped bamboo.
<i>Bambusa</i> sp. (small green)	G+	—	—	Small green bamboo.
<i>Bambusa</i> sp. (green)	G	—	—	Green bamboo.
<i>Bambusa</i> sp. (fish pole)	E	—	—	Rapid spreading bamboo, used for fishing poles.
<i>Baryxylum africanum</i>	E	—	—	Ornamental tree with yellow flowers.
<i>Bauhinia alba</i>	G	—	—	White butterfly tree—white butterfly or orchid-like flowers.
<i>Bauhinia hookeri</i>	F	—	—	Pink flowers.
<i>Bauhinia malabarica</i>	F	—	—	Small bush tree with white flowers from the mountains of northeast India.
<i>Bauhinia megalandra</i>	F	—	—	Ornamental.
<i>Bauhinia triandra</i>	G	—	—	Purple butterfly bush—flowers reddish, fragrant and very attractive.
<i>Bauhinia variegata</i>	F	—	—	Much like <i>B. purpurea</i> in habit—flowers are rose colored and variegated with red and yellow.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Bauhinia</i> sp. 699	F	— —	— —	Small tree—all <i>Bauhinias</i> have similar leaves and flowers and are considered very ornamental.
<i>Bauhinia</i> sp. 4001	F	— —	— —	Shrub—all <i>Bauhinias</i> have similar leaves and flowers and are considered very ornamental.
<i>Bauhinia</i> sp. 4217	G	— —	— —	Reproducing naturally. Small flowering tree.
<i>Bignonia chrysantha</i>	F	— —	— —	Evergreen tree—flowers in terminal dense racemes, yellow, funnelform, 2 inches long.
<i>Bombax malabaricum</i>	F	— —	— —	Red cotton tree—upright, quick-growing deciduous tree. Flowers red, edible—wood is used for making tea boxes.
<i>Bombycidendron</i> sp. L 68	F	— —	— —	Ornamental — belonging to the <i>Hibiscus</i> family.
<i>Brassaia actinophylla</i>	G	— —	— —	Sangrado—tree with shiny attractive foliage.
<i>Brexia madagascariensis</i>	F	— —	— —	Native of Madagascar.
<i>Brownea macrophylla</i>	F	— —	— —	Partially climbing shrub to 18 feet, from Panama.
<i>Buddleia lindleyana</i>	F	— —	— —	Ornamental shrub to 6 feet, from China. Flowers purplish violet in spikes.
<i>Buddleia</i> sp. 707	G	— —	— —	Yellow <i>Buddleia</i> — ornamental flowering shrub.
<i>Caesalpinia japonica</i>	F	— —	— —	Thorny shrub; flowers canary-yellow with bright red stamens.
<i>Caesalpinia sappan</i>	F	— —	— —	Sappan wood — large straggling prickly, semi-climbing shrub. The dark red heart-wood yields a dye.
<i>Calliandra</i> sp. 1908	F+	— —	— —	Red <i>Calliandra</i> —shrub with large red <i>lehua</i> -like flowers.
<i>Calliandra</i> sp. 3525	F	— —	— —	<i>Calliandra</i> — shrub with pinkish <i>lehua</i> -like flowers.
<i>Callitris calcarata</i>	F	— —	— —	Black Murray pine; evergreen to 60 feet or more from Australia. Good timber.
<i>Callitris glauca</i>	F	— —	— —	Australian white pine. Good timber.
<i>Callitris muelleri</i>	F	— —	— —	Mueller's cypress pine—tree up to 30 feet from Australia. Good timber.
<i>Callitris robusta</i>	F	— —	— —	Lachlan pine—evergreen tree up to 100 feet from Australia. Good timber.
<i>Calophyllum</i> sp. 2995	F	— —	— —	Tropical tree with leathery leaves; fruit edible.
<i>Calpurnia aurea</i>	G	— —	— —	Leguminous shrub from tropical and Southern Africa.
<i>Camelia chandteri elegans</i>	G	G	— —	Ornamental flowering shrub with very attractive flower and foliage.
<i>Camellia herme</i>	G	G	— —	" " " " "
<i>Camellia japonica</i> (double white)	F	G	— —	" " " " "
<i>Camellia</i> Mme Strekoloff	G	F	— —	" " " " "
<i>Camellia</i> sp.	F	— —	— —	" " " " "
<i>Camphora officinalis</i>	G	— —	— —	Camphor tree—source of camphor.
<i>Cananga odorata</i>	G	— —	— —	Fair-sized tree from the Malayan Archipelago with straight clear bole. Flowers greenish or yellowish, very fragrant.
<i>Canarium kerrii</i>	F	— —	— —	Related to the <i>pili</i> nut—edible.
<i>Canarium luzonicum</i>	G	— —	— —	<i>Pili</i> nut—Philippine species. Edible.
<i>Canarium ovatum</i>	G	— —	— —	" " " " "

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Canarium</i> sp. 125	F	—	—	Related to the <i>pili</i> nut—not growing too well.
<i>Carissa carandus</i> (var. <i>Dulcis</i>)	F	—	—	Karanda—very spiny evergreen shrub with white or pink flowers. Sometimes used as hedge.
<i>Carissa grandiflora</i> PI 98222	G	—	—	Natal plum — spiny shrub, scarlet edible fruit. Flowers white, fragrant.
<i>Carissa</i> sp.	F	—	—	Very thorny scandent shrub.
<i>Carludovica palmata</i>	G	—	—	Palm-like plant without trunk—ornamental fan-shaped leaves. Source of Panama hat.
<i>Cassia bakeriana</i>	F	—	—	Very large showy pink flowers about two or three times the size of <i>Cassia nodosa</i> .
<i>Cassia brasiliensis</i>	G	—	—	Ornamental tree.
<i>Cassia fistula</i>	G	—	—	Golden shower—suited to drier climate.
<i>Cassia glauca</i>	G	—	—	Shrub with yellow flower — very profuse bloomer.
<i>Cassia hybrida</i> (rainbow shower)	G	—	—	Hybrid shower of highly ornamental value.
<i>Cassia multijuga</i>	G	—	—	Large bright yellow flowers, blooming profusely.
<i>Cassia siamea</i>	F	—	—	Siamese shower—large cluster of small yellow flowers.
<i>Cassia spectabilis</i> FPI 87506	G	—	—	Tree up to 40 feet; flowers bright yellow—native of tropical America.
<i>Cassia surratensis</i> PI 116779	F	—	—	Leguminous shrub with clusters of showy yellow flowers.
<i>Cassia timorensis</i>	F	—	—	This species identified as <i>Cassia multijuga</i> .
<i>Castanospermum australe</i>	F	—	—	Moreton Bay chestnut—evergreen trees up to 60 feet with large pinnate leaves from Australia. Seeds eaten by the natives.
<i>Castilloa elastica</i>	F	—	—	Mexican rubber — tall quick-growing tree. Source of Panama rubber.
<i>Casuarina cunninghamiana</i>	F	E	—	Cunningham ironwood — tree with slender branches, much like <i>Casuarina equisetifolia</i> . Reported to be rapid growing.

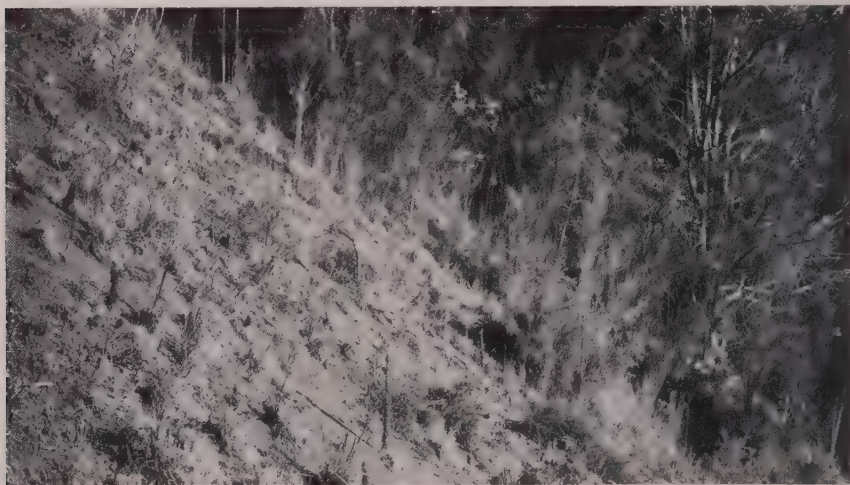


Fig. 17. *Casuarina glauca* (long-leaf ironwood) spreading from root suckers in land scars. Kohala Forest Reserve, Waipio Pali.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Casuarina glauca</i>	E	—	—	Long-leaf ironwood. Wood tough. Grows rapidly.
<i>Casuarina montana</i>	G	E	—	Mountain ironwood — handsome tree with long drooping branchlets. Suited to higher elevation.
<i>Casuarina stricta</i>	G	—	—	Australian beef wood—tree 30 to 60 feet. Native of Australia.
<i>Casuarina</i> sp. 1023	E	—	—	Ironwood—growing exceptionally well.
<i>Catalpa bignonioides</i>	—	F	—	Low tree with wide-spreading branches; pods and seeds said to have medicinal qualities.
<i>Catalpa speciosa</i>	—	G	—	Western Catalpa—tree to 100 feet; very desirable ornamental tree.
<i>Cecropia peltata</i>	E	—	—	Trumpet tree—extremely fast-growing tree from the West Indies—hollow branches used in making wind instruments.
<i>Cecropia</i> sp. P 14	F	—	—	Rapid-growing tree related to the above.
<i>Cedrela australis</i>	E	E	—	Australian red cedar—a fast-growing tree with dark green foliage—excellent wood.
<i>Cedrela fissilis</i>	F	—	—	Tree up to 50 feet or more; native of Panama and South America.
<i>Cedrela odorata</i>	E	—	—	Cigar box cedar—fast-growing tree up to 100 feet. Source of wood for cigar boxes.
<i>Cedrus deodara</i>	—	—	E	Deodar cedar—tall tree of pyramidal habit; up to 150 feet. Beautiful bluish green foliage.
<i>Ceiba pentandra</i>	G	—	—	Kapok tree—Source of kapok of commerce.
<i>Celtis sinensis</i>	E	—	—	Chinese hackberry—tree from China, Korea and Japan — wood straight-grained, light and elastic; used for manufacturing small articles and furniture.
<i>Cestrum nocturnum</i>	G	—	—	Queen of the night—large straggling shrub with greenish-white flowers; strongly scented at night.
<i>Chamaecyparis lawsoniana</i>	F	G	—	Lawson's cypress — good timber tree with bluish-green foliage.
<i>Chamaecyparis obtusa</i>	F	G	—	Hinoki cypress—valuable timber tree of Japan.
<i>Chamaecyparis pisifera</i>	F	F	—	Sawara cypress—not as hardy as the two former species.
<i>Chrysobalanus icaco</i>	G	—	—	Coco plum—ornamental shrub with pinkish pulpy fruit.
<i>Chrysophyllum monopyrenum</i>	G	—	—	Damson plum—ornamental tree from the West Indies; fruit insipid.
<i>Cinchona succirubra</i>	G	—	—	Source of quinine.
<i>Cinnamomum zeylanicum</i>	G	—	—	Cinnamon—source of cinnamon.
<i>Cipedsa</i> sp. 2305	F	—	—	Rosaceous shrub—ornamental shrub with attractive pink berries.
<i>Clausena wampi</i>	G	—	—	Edible fruit from China.
<i>Coccoloba uvifera</i>	G	—	—	Sea grape—edible fruit; wood used in cabinet work and when boiled, gives a red color.
<i>Coccoloba</i> sp. 3134	F	—	—	Small tree.
<i>Cochlospermum hibiscoides</i>	G	—	—	Ornamental tree with large bright-yellow flowers.
<i>Codiaeum variegatum</i>	G	—	—	Croton—showy foliage of assorted colors.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Coffea arabica</i>	G	—	—	Arabian coffee—one source of coffee.
<i>Colutea arborescens</i>	—	—	E	Bladder senna—shrub grown for its attractive flowers and ornamental bladder-like pods.
<i>Cordia dichotoma</i>	F	—	—	Small tree.
<i>Corynocarpus laevigatus</i>	F	G	—	Karaka—tree from New Zealand with shiny foliage and edible fruit.
<i>Costus villosissimus</i>	G	—	—	Plant of the ginger family—hairy leaves and leaf stalks.
<i>Costus</i> sp. 4611	G	—	—	Ginger-like plant.
<i>Cotoneaster franchetti</i>	G	G	—	Franchet Cotoneaster — ornamental shrub with attractive red berries.
<i>Cotoneaster frigida</i>	—	G	—	One of the most beautiful of the Cotoneasters in flower and fruit. Fruit scarlet.
<i>Cotoneaster pannosa</i>	F	G	—	Very handsome, half-evergreen shrub; fruit red; ornamental.
<i>Cotoneaster</i> sp. 4825	G	—	—	Rosaceous with ornamental berry-like fruits.
<i>Crescentia cujete</i>	G	—	—	Calabash tree—small tree, bearing ornamental gourds used for ornaments and for cups.
<i>Crinum giganteum</i>	G	—	—	Giant lily with long white flowers from tropical America.
<i>Cryptomeria japonica</i>	G	E	G	Japan cedar—good timber tree.
<i>Cunninghamia lanceolata</i>	G	G	F	Chinese fir—handsome evergreen of pyramidal shape; good forest tree.

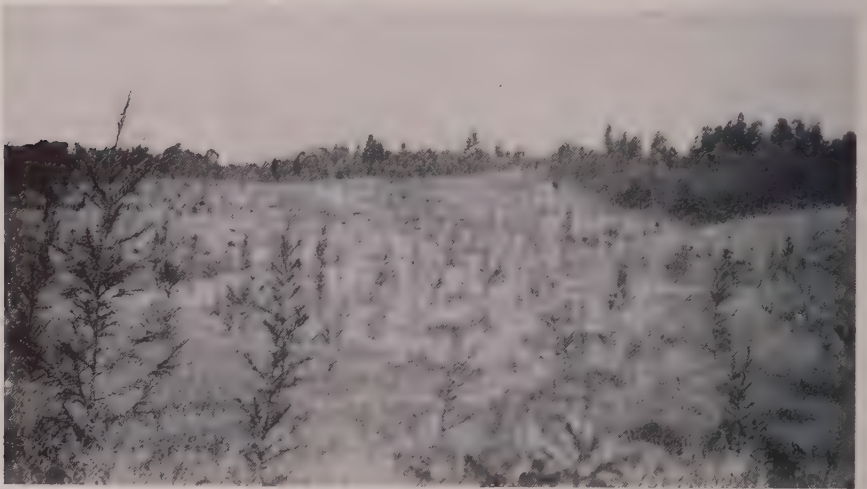


Fig. 18. *Cryptomeria japonica* (Sugi), Hilo Reserve, land of Honomu, 3 years old. During the war years this species proved very profitable and was cut and sold as a Christmas tree. One plantation sold nearly \$20,000 worth of them.

<i>Cupressus arizonica</i>	G	G	—	Arizona cypress—cypress with bluish-green leaves.
<i>Cupressus benthami knightiana</i>	G	—	—	Knight cypress—cypress from Mexico with slender horizontal branches and bright green leaves.
<i>Cupressus forbesii</i>	F	—	—	Cypress tree, doing fairly well.

SPECIES	Location and Vigor			REMARKS
	1	2	8	
<i>Cupressus funebris</i>	G	—	—	Mourning cypress — cypress from China; wide spreading, pendulous branches.
<i>Cupressus glabra</i>	F	—	—	Tree with a compact, narrowly oval, somewhat pyramidal crown with bright blue-green foliage.
<i>Cupressus glauca pendula</i>	G	—	—	Synonymous with <i>Cupressus lusitanica</i> .
<i>Cupressus goveniana</i>	F	—	—	Tree up to 50 feet; native of California.
<i>Cupressus lusitanica</i>	G	—	—	Portuguese cypress—very fast-growing cypress. Habitat unknown; cultivated in Portugal.



Fig. 19. *Cupressus lusitanica* (Portuguese cypress). These trees have only been planted for ten months and are now ready to be cut for use as Christmas trees. This species grows very rapidly and makes a good windbreak.

<i>Cupressus macrocarpa</i>	G	E	F	Monterey cypress—tree well adapted to elevation 5,000 to 6,000 feet.
<i>Cupressus pygmaea</i>	F	—	—	Variety of <i>Cupressus goveniana</i> .
<i>Cupressus sargentii</i>	F	—	—	" " " "
<i>Cupressus torulosa</i>	G	—	—	Bhutan cypress—tall pyramidal tree up to 150 feet high; native of the Himalayas; at altitudes from 5,500 to 8,000 feet.
<i>Cupressus</i> sp. 5090	G	—	—	Cypress tree growing fairly well.
<i>Cyperus papyrus</i>	G	—	—	Reed-like plant with long stems holding a bushy head of fine grass-like greenery. Prefers wet ground.
<i>Dalbergia mamosa</i>	G	—	—	Medium-sized tree; native to the tropics.
<i>Dalbergia sissoo</i>	F	—	—	Sisoo wood—good-sized tree up to 80 feet. One of the best timbers in India. Very durable.
<i>Debregeasia velutina</i>	F	—	—	Shrub grown for its handsome foliage and ornamental red fruits.
<i>Dendrocalamus giganteus</i>	G	—	—	Giant bamboo—large bamboo with stems up to 10 inches in diameter in Burma where it is native. Used for plant pots, buckets, etc.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Dillenia indica</i>	F	—	—	Indian Dillenia—very handsome tropical tree with showy flowers 9 inches across. Fruit acid; edible.
<i>Dillenia philippinensis</i>	G	—	—	Native of the Philippines; flowers large, showy, white petals and purplish stamen and styles. Fruit fleshy, soft pulp, acid, edible.
<i>Dillenia</i> sp. P 27	F	—	—	Small tree related to the above.
<i>Diospyros discolor</i>	G	—	—	Mabolo—well-shaped medium-sized tree with large brownish, red edible fruit with rather unpleasant odor.
<i>Diphysa robinoides</i> PI 124870	G	—	—	Attractive small tree with pinnate leaves and numerous rather large yellow flowers in clusters.
<i>Dolichandrone rheedii</i>	G	—	—	Native to the Philippines. It is widely distributed along the sea shore.
<i>Dolichandrone stipulata</i>	F	—	—	Bignoniaceous tree not doing well.
<i>Dombeya</i> sp.	G	—	—	Small tree with showy rosy flowers crowded into dense heads.
<i>Dracaena australis</i>	F	G	—	Plant with long narrow crowded leaves, palm-like in appearance and very ornamental.
<i>Dracaena draco</i>	G	—	—	Dragon tree — grows very tall, branching when old; very ornamental while young.
<i>Dracaena fragrans</i>	F	—	—	Handsome, long-foliaged plant of highly decorative value.
<i>Dracaena indivisa</i>	F	G	—	Ornamental tree with dark green leaves, densely crowded, 2 to 6 feet long; 4 to 6 inches broad at the middle.
<i>Dracontomelum dao</i>	F	—	—	Tree belonging to the cashew nut family; not doing well.
<i>Duranta repens</i>	G	—	—	Very attractive shrub with showy, lilac-purple or white flowers and orange berries.
<i>Ehretia elliptica</i> FPI 103406	G	—	—	Tree with small white fragrant flowers and small yellow fruit with thin edible pulp.
<i>Elaeocarpus grandis</i>	G	—	—	Evergreen tree with attractive blue ornamental fruits.
<i>Elaeodendron glaucum</i>	F	—	—	Pyramidal tree with dark, glossy, green oval leaves. Juvenile leaves, narrow and long, with prominent veins.
<i>Englehardtia spicata</i>	G	—	—	Only one tree survived.
<i>Enterolobium cyclocarpum</i>	G	—	—	Elephant ear—huge rapid-growing tree with very fine leaves.
<i>Erythrina fusca</i>	F	—	—	Flowers brownish-red; bark prickly, brownish. Native of Cochin, China.
<i>Erythrina tomentosa</i>	G	—	—	Small leguminous tree; native to South Africa; trifoliate foliage; spike-like clusters of crimson blossoms.
<i>Erythrina variegata</i>	G	—	—	
<i>Erythrina</i> sp. 714	F	—	—	Leguminous tree with showy papilionaceous flowers in racemes.
<i>Erythroxylon coca</i>	F	—	—	Cocaine tree—bush; native to South America and eastern tropics; source of cocaine.
<i>Euphorbia pulcherrima</i>	G	—	—	Shrub from Mexico with brilliant scarlet bracts.
<i>Ficus aurea</i>	G	—	—	Handsome decorative tree; fruit orange-yellow.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Ficus bengalensis</i>	G	---	---	Bengal banyan tree.
<i>Ficus benjamina</i>	G	---	---	Benjamin fig—spreading tree with large aerial roots, which later form into accessory trunks.
<i>Ficus columnaris</i>	F	---	---	Forest tree—now fruiting.
<i>Ficus cunia</i>	G	---	---	Small evergreen trees; not epiphytic.
<i>Ficus crassiuscula</i>	F	---	---	Tree of medium-size, doing fairly well.
<i>Ficus chretoides</i>	F	—	—	Magura fig — medium-size tree; native to Australia; fruit, heart-shaped, edible.
<i>Ficus elastica</i>	E	---	---	India rubber tree—tree up to 100 feet tall. Young tree has large leaves and is used as ornamental pot plant.
<i>Ficus glomerata</i>	G	---	---	Cluster fig—a quick-growing evergreen, dense shade tree; small fruits relished by cattle.
<i>Ficus hispida</i>	G	---	---	Evergreen tree 40 to 50 feet; from Asia and tropical Australia.
<i>Ficus indica</i>	E	—	---	Tree up to 50 feet. This species is often confused in botanical literature with <i>F. bengalensis</i> . Does not take root from the branches like <i>F. bengalensis</i> .
<i>Ficus macrophylla</i>	G	---	---	Moreton Bay fig—large spreading tree of Queensland with large leathery leaves.
<i>Ficus mollatocarpa</i>	G	---	---	Medium-size tree doing well.
<i>Ficus malunensis</i>	E	---	---	Now fruiting—good growth.
<i>Ficus mindoriensis</i>	G	---	---	Native to Mindoro, P. I.
<i>Ficus nota</i>	G	---	---	Rough-leaf fig—tropical fig tree of medium-size producing clusters of edible fruits.
<i>Ficus palawanensis</i>	E	---	---	Medium-sized tree doing very well.
<i>Ficus parcelii</i>	G	---	---	Lunalilo fig — leaves, light green mottled with cream-white in the manner of mosaic; very ornamental.
<i>Ficus platypoda-petiolaris</i>	F	---	—	Native of Australia doing fairly well.
<i>Ficus pseudopalma</i>	E	---	---	Palm-like fig—small unbranched tree with stiffish long leaves clustered at the top.
<i>Ficus rigo</i>	F	---	---	Small tree—not doing well.
<i>Ficus rubiginosa</i>	G	---	---	Native of Australia, producing fertile seed and doing well.
<i>Ficus ruficaulis</i>	G	---	---	Medium-sized tree; in fruit and doing well.
<i>Ficus satterthwaitei</i>	F	---	---	Small tree; in fruit though not doing well.
<i>Ficus stephanocarpa</i>	F	---	---	Small tree; fruiting; growth fair.
<i>Ficus ulmifolia</i>	G	---	---	Elmleaf fig — rough twigged shrub with rough leaves. Native to the Philippines.
<i>Ficus</i> sp.	F	---	---	Samoan fig — small tree introduced from Samoa. In fruit and doing fairly well.
<i>Ficus</i> sp. 1225	E	---	---	Large, vigorous tree with many aerial roots.
<i>Ficus</i> sp. 1272	F	---	---	Medium-sized tree; growing fairly well.
<i>Ficus</i> sp. 1360	E	---	---	Large tree with many aerial roots; doing very well.
<i>Ficus</i> sp. 1525	G	---	---	Medium-sized tree; good growth.
<i>Ficus</i> sp. 1551	E	---	---	Medium-sized tree; good growth.
<i>Ficus</i> sp. 1729	F	---	---	Small tree; fair growth.
<i>Ficus</i> sp. 1979	G	---	---	Large tree; vigorous growth.
<i>Ficus</i> sp. 2548	G	---	---	Large tree; good growth.
<i>Ficus</i> sp. 2590	F	---	---	Small tree; fair growth.
<i>Ficus</i> sp. 2592	F	---	---	Single slender trunk; fair growth.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Ficus</i> sp. 2601	G	—	—	Small tree; in fruit; doing well.
<i>Ficus</i> sp. 2603	F	—	—	Small tree; in fruit; doing fairly well.
<i>Ficus</i> sp. 2611	G	—	—	Medium-sized tree; good growth.
<i>Ficus</i> sp. 2625	E	—	—	Large tree; very vigorous.
<i>Ficus</i> sp. 2773	G	—	—	Small tree from Baguio, P. I. Doing well and fruiting.
<i>Ficus</i> sp. 3989	E	—	—	Large tree with many aerial roots. Growing very vigorously and fruiting.
<i>Filicium decipiens</i>	F	—	—	Fern tree—medium-sized tree of slow growth with very handsome fern-like foliage. Native of Ceylon.



Fig. 20. *Fraxinus* sp. (tropical ash) showing natural reproduction in the Waiaha Spring Reserve. This small Reserve (193 acres) is the first one we have entirely reforested.

SPECIES	Location and			Vigor	REMARKS
	1	2	3		
<i>Firmiana barteri</i> PI 124672	F	---	---	---	Ornamental tree from tropical Africa with small coral-pink flowers. Wood light, used for fish nets and floats.
<i>Flacourtia indica</i>	G	---	---	---	Synonymous with <i>F. ramontchi</i> .
<i>Flacourtia ramontchi</i>	G	---	---	---	Ramontchi—small tree; native to tropical Africa and Asia with purple, cherry-like edible fruit.
<i>Fontanesia chinensis</i>	F	---	---	---	Shrub grown for its handsome foliage; used as hedge in China.
<i>Forestiera porulosa</i>	F	---	---	---	Hardy shrub allied to the privet.
<i>Forestiera rhamnifolia</i> FPI 98069	G	---	---	---	Small tree; native to the West Indies. Bears bright blue ovoid fruits $\frac{1}{2}$ -inch long.
<i>Fraxinus americana</i>	---	G	---	---	White ash—good forest tree; tough, straight-grained wood used for tool handles, carriages and wagons, interior of houses and furniture.
<i>Fraxinus velutina</i>	F	---	---	---	Ash—tree up to 40 feet; native to western United States. One variety of the species suited to saline and alkaline soil.
<i>Fraxinus</i> sp. L246	G	---	---	---	Medium-sized tree doing fairly well.
<i>Fraxinus</i> sp.	E	E	---	---	Tropical ash—similar to the above but grows much faster and bigger.
<i>Furcraea pubescens</i> PI 131423	G	---	---	---	A nearly trunkless plant. Native to Mexico with spreading leaves up to 5 feet long by 3 inches wide.
<i>Galphimia glauca</i>	G	---	---	---	Thyallis—shrub with bright yellow panicles of flowers. Native to Mexico; good border plant.
<i>Garcinia benthami</i>	G	---	---	---	Relative of the mangosteen.
<i>Garcinia xanthochymus</i>	F	---	---	---	False mangosteen — well-shaped tree with long dark green foliage. Fruit yellow, very acid, edible.
<i>Gardenia brighami</i>	F	---	---	---	Small tree, indigenous to Hawaii. Flowers beautiful, white and very fragrant.
<i>Gardenia florida</i>	F	---	---	---	Giant double gardenia — shrub with large white, very fragrant flowers.
<i>Gardenia tahitensis</i>	F	---	---	---	Tahitian gardenia—shrub with star-shaped, single white, fragrant flowers.
<i>Gliricidia maculata</i>	F	---	---	---	Madre de Cacao — tree native to Central America with pink flowers; blooms profusely.
<i>Gmelina arborea</i>	G	---	---	---	Gumhar—tree up to 60 feet; from India and Malaya.
<i>Gmelina fasciculiflora</i>	G	---	---	---	Evergreen tree 60 to 70 feet with pale purple flowers. Native to Queensland.
<i>Gmelina philippinensis</i>	F	---	---	---	Erect, spiny shrub, native to the Philippines. Flowers yellow.
<i>Graptophyllum pictum</i>	G	---	---	---	Caricature tree—foliage plant which makes good hedge (red).
<i>Grevillea robusta</i>	E	---	---	---	Silky oak—timber tree from eastern Australia. Wood useful in many ways.
<i>Grevillea</i> sp. 847	F	---	---	---	Small ornamental tree with trusses of white flowers.
<i>Grewia nudiflora</i>	F	---	---	---	Shrub; not doing too well.
<i>Gynocardia odorata</i>	F	---	---	---	Large tree of Sikkim—source of gynocardia oil (drying oil of good quality).

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Heliconia brasiliensis</i>	E	— —	— —	Lobster claw—yellow, ornamental plant of the banana family with highly ornamental flower stalks and sheaths.
<i>Heliconia</i> sp.	G	— —	— —	Ornamental foliage plant.
<i>Heliocarpus americanus</i>	F	— —	— —	South American basswood — fast-growing tree with pinkish flowers; wood very light.
<i>Hibiscadelphus hualalaiensis</i>	F	— —	— —	<i>Hau kuahiwi</i> — small tree related to the Hibiscus with leaves resembling <i>hau</i> . Indigenous to Hawaii. Only few specimens are alive.
<i>Hibiscus rosa-sinensis</i>	G	— —	— —	Common Hibiscus — Hibiscus is too well known to need description.
<i>Hibiscus</i> sp. 3421	G	— —	— —	Tahitian <i>hau</i> —small tree with lobed leaves. Introduced from Tahiti. Growing well.
<i>Holmskioldia sanguinea</i>	G	— —	— —	Parasol flower—scandent shrub with orange-red, odd, parasol-like flowers.
<i>Honckenya ficifolia</i>	F	— —	— —	Ornamental flowering shrub; native to western tropical Africa. Flower large, purple.
<i>Hovenia dulcis</i>	F	— —	— —	Raisin tree — small tree with handsome foliage. Native to Japan, China and Himalayas.
<i>Hura crepitans</i>	G	— —	— —	Sandbox tree—tree up to 100 feet with large poplar-like leaves, is noted for its explosive capsules.
<i>Hydnocarpus anthelminticus</i>	F	— —	— —	Chaulmoogra tree—medium-sized tree of India, Burma, etc. Oil similar to chaulmoogra oil is obtained from the seed and sometimes used as a substitute.
<i>Hymenaea courbaril</i>	F	— —	— —	Leguminous tree, native of West Indies to Brazil. Yields amber-like resin known as courbaril or West Indian copal. Wood hard, heavy-grained; used for wheel work, tree nails, beams and in machinery.
<i>Ilex aquifolium</i>	— —	E	— —	English holly—pyramidal tree up to 40 feet with shiny, spiny, wavy leaves. Fruit scarlet, round and shining.
<i>Ilex cassine</i>	G	P	— —	Florida holly—tropical holly with ornamental red berries.
<i>Ilex cornuta</i>	— —	G	— —	Shrub with short spreading branches; leaves spiny, dark glossy green above; scarlet flowers in clusters.
<i>Ilex dahoon</i>	G	— —	— —	Dahoon holly—synonymous with <i>Ilex cassine</i> .
<i>Ilex integra</i>	G	— —	— —	Evergreen tree up to 40 feet; leaves variable in size and shape; fruit red, globose.
<i>Ilex opaca</i>	G	E	— —	American holly—tree with spreading short branches, sometimes up to 50 feet forming a narrow pyramidal head; leaves dull green above, yellowish green beneath; fruit dull scarlet.
<i>Ilex paraguariensis</i>	G	— —	— —	Paraguay tea—small tree, native to Brazil. Source of mate, or Paraguay tea.
<i>Ilex sikkimensis</i> PI 62810	G	— —	— —	A moderately tall Himalayan tree with stout branches; leathery spiny leaves and yellow berries.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Ilex</i> sp. PI 112222	F	—	—	Holly introduced from China, growing fairly well.
<i>Inocarpus edulis</i>	F	—	—	Otaheite chestnut—rapid-growing tree with dense green foliage; flowers small, fragrant, pale yellow. The drupe contains kernel which is edible when roasted.
<i>Intsia bijuga</i>	F	—	—	Ipil—erect tree up to 80 feet with pinnate leaves. Tropical shores of Madagascar, through Malaya to the Caroline Islands.
<i>Ixora macrothyrsa</i>	G	—	—	Shrub with large cluster of very showy, deep red, crimson-tinged flowers.
<i>Ixora</i> sp. 3267	F	—	—	Yellow <i>Ixora</i> —small woody plant with cluster of yellow flowers.
<i>Ixora</i> sp. 658	G	—	—	<i>Ixora</i> —flowering shrub. Growing well.
<i>Ixora</i> sp. P5070	F	—	—	Flowering shrub.
<i>Jacaranda mimosaeifolia</i>	E	—	—	Tree with ferny foliage and large blue, bell-shaped flowers.
<i>Jasminum sambac</i>	G	—	—	Pikake—low, partly creeping shrub noted for its tiny creamy-white, sweet-scented flowers.
<i>Jatropha curcas</i>	G	—	—	Purgive nut — small deciduous tree from tropical America; juice poisonous.
<i>Joannesia princeps</i>	G	—	—	Anda Assu—large tree from Brazil with inconspicuous flowers; fruit 4 to 5 inches thick, coconut-like with 4 large oily seeds.
<i>Juglans formosana</i>	F	—	—	Formosan walnut—native to Formosa.
<i>Juglans nigra</i>	—	F	—	Black walnut—lofty tree up to 150 feet. One of the noblest trees of American forests. Nut thick-shelled, edible.
<i>Juglans cinerea</i>	—	G	—	Butternut—large tree, occasionally up to 100 feet. Prefers rich soil along banks of streams. Wood valued for interior finishing and cabinet work. Nuts delicious.
<i>Juniperus australis</i>	G	—	—	Australian juniper—tree up to 50 feet with spreading branches and slender pendulous branchlets. One of the most beautiful of junipers.
<i>Juniperus barbadensis</i>	F	—	—	Barbados cedar—tree up to 40 feet; foliage bluish-green.
<i>Juniperus bermudiana</i>	G	G	F	Bermuda juniper — synonymous with the above.
<i>Juniperus chinensis</i>	—	—	E	Chinese juniper—tree up to 60 feet; there are numerous horticultural varieties of high ornamental value.
<i>Juniperus communis</i>	—	—	E	Common juniper—upright tree growing up to 40 feet; widely distributed in North America. A variable species with several varieties.
<i>Juniperus sabina</i>	F	F	F	Spreading shrub, branchlets slender of a very strong disagreeable odor when bruised.
<i>Juniperus scopulorum</i>	—	—	F	Tree forming a broad head with stout spreading branches—foliage glaucous or yellowish-green.
<i>Juniperus virginiana</i>	G	G	G	Red cedar—tree up to 100 feet with conical head and spreading or upright branches; variable species.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Khaya nyasica</i>	E	---	---	Valuable timber tree from Africa with straight clear bole—rapid grower.
<i>Kigelia africana</i>	G	---	---	Sausage tree—comparing this species with description it is probably <i>K. pinnata</i> .
<i>Kigelia pinnata</i>	G	---	---	Sausage tree—moderate-sized tree bearing large, oblong, grey, sausage-like fruits; flowers large purplish.
<i>Koelreuteria formosana</i>	G	---	---	Ornamental tree from Formosa.
<i>Koelreuteria paniculata</i>	G	---	---	Golden rain tree—tree with golden yellow flowers and attractive pink papery fruits.
<i>Kokia drynarioides</i>	F	---	---	Kokio similiar to <i>K. rockii</i> . Grows on Molokai.
<i>Lagerstroemia indica</i>	G	---	---	Crepe Myrtle—highly ornamental shrub with showy pink crepey flowers.
<i>Lagerstroemia speciosa</i>	G	---	---	Queens flower—synonymous with <i>L. flos reginae</i> .
<i>Lagerstroemia</i> sp.	F	---	---	Ornamental flowering shrub doing poorly.



Fig. 21. Left: *Libocedrus decurrens* (incense cedar) growing on Mauna Kea at nearly 11,000 feet. This tree is 36 years old and is only 12 feet high. When measured in 1921 it was 3 feet high, and has only grown 9 feet in 25 years. Right: The same species as shown on the left but growing under much more favorable conditions on the same mountain at 7,450 feet elevation. Planted at the same time, it is now 35 feet high with a diameter, breast high, of 20 inches.

SPECIES	Location and			REMARKS
	1	2	3	
<i>Lagunaria patersonii</i>	F	— —	— —	Largest member of the Hibiscus family; attaining 80 feet in height. Flowers pink or purple. It likes humid climate and saline atmosphere.
<i>Leca sambucina</i>	F	— —	— —	Large shrub with pinnate, very large (often 4 feet long) ornamental leaves. Native of India, Malaya, Philippines, etc.
<i>Libocedrus decurrens</i>	— —	G	E	Incense cedar — ornamental tree chiefly grown for its handsome evergreen foliage and good habit.
<i>Ligustrum</i> sp.	G	— —	— —	Ornamental shrub grown for its attractive foliage.
<i>Liquidambar styraciflua</i>	F	G	— —	Sweet gum—beautiful pyramidal tree of very symmetrical habit with maple-like leaves. Resin is used in the preparation of chewing gum.
<i>Liriodendron tulipifera</i>	G	G	— —	Tulip tree—hardy beautiful tree of pyramidal habit; flowers large, tulip-shaped; soft, fine-grained, light-yellow wood used for furniture, boat building, etc.
<i>Lonchocarpus formosanus</i>	G	— —	— —	Leguminous tree from Formosa with pinnate leaves; drooping branches.
<i>Lonchocarpus latifolius</i>	F	— —	— —	Shrub with pale purple flowers; native to West Indies, Central and South America.
<i>Macaranga bicolor</i>	F	— —	— —	Small ornamental tree grown for its foliage.
<i>Macaranga grandifolia</i>	E	— —	— —	Binga Bing—highly ornamental shrub with large decorative foliage.
<i>Macaranga tanarius</i>	E	— —	— —	Malabunga—grows taller than the above species, but leaves are very much smaller and not as ornamental.
<i>Machaerium tipu</i>	G	— —	— —	Brazilian rosewood—tree up to 30 feet or more with yellow flowers; source of rosewood.
<i>Maesa indica</i> PI 116597	G	— —	— —	Small, evergreen tree with large leaves; white flowers; berries white, edible.
<i>Magnolia grandiflora</i>	G	— —	— —	Magnolia—tall tree with large white flowers measuring 12 inches in diameter in its native habitat. Native of North America.
<i>Magnolia soulangeana</i>	G	— —	— —	Tree with large creamy-white flowers suffused with pink.
<i>Magnolia stellata</i>	G	F	— —	Tree is of dwarf habit; flowers are pure white, semi-double, and very fragrant.
<i>Mallotus philippinensis</i>	G	— —	— —	Kamila — small much-branched tree; wood hard and close grained; useful for bobbins. Dye known as kamila is obtained and used for dyeing silk.
<i>Malpighia coccigera</i>	G	— —	— —	Singapore holly—ornamental plant excellent for hedge; pinkish crepey flowers.
<i>Malus</i> sp.	E	— —	— —	Flowering variety of crabapple.
<i>Markhamia hildebrandii</i>	G	— —	— —	Small tree with pinnate leaves and showy yellow Tecoma-like flowers in terminal panicles. Tropical Africa.
<i>Maycepa</i> sp.	G	— —	— —	Small well-shaped tree with olive-like fruits.
<i>Meibomia tiliaefolia</i> PI 116600	F	— —	— —	Large deciduous leguminous shrub of the Himalayas.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Melastoma</i> sp.	F	—	—	Melastoma—weed.
<i>Melia azedarach</i>	G	—	—	Pride of India—medium-sized tree; wood hard and durable, used for house building and furniture.
<i>Melochia indica</i>	E	—	—	Fast-growing tree which looks like <i>kukui</i> from the distance.
<i>Michelia mulan</i>	F	—	—	Tree with strong fragrant flowers.
<i>Mimusops elangi</i>	G	—	—	Muna-mul—handsome evergreen tree; flowers very fragrant from which perfume is obtained; fruits edible.
<i>Morus</i> sp.	G	—	—	Small tree with large leaves similar to the common mulberry—Russian mulberry.
<i>Muntingia calabura</i>	G	—	—	Jamaica cherry—edible fruit.
<i>Muraya exotica</i>	G	—	—	Mock orange—shrub with dark green foliage used for hedge.
<i>Musa sumatrana beccari</i>	G	—	—	Ornamental banana with irregular blotches of claret brown on leaves. Especially ornamental when young.
<i>Musa</i> sp. P 6597	G	—	—	Dwarf banana with showy pink flowers.
<i>Musanga smithii</i>	E	—	—	Very elegant tree, allied to <i>Cecropia</i> ; wood good, suitable for house building.
<i>Mussaenda pilossima</i>	G	—	—	Ornamental shrub.
<i>Myrica cerifera</i>	E	—	—	Related to the fire tree described below.
<i>Myrica faya</i>	E	—	—	Fire tree — very rapid-growing tree with edible fruit, relished by birds. Spreads fast and considered a serious pest.
<i>Myroxylon senticosum</i>	G	—	—	A very ornamental, shapely, small tree having dense, glossy foliage and small dark-red fruits.
<i>Myroxylon toluiferum</i>	F	—	—	Tolu balsam—tree up to 100 feet; source of Tolu balsam.
<i>Nandina domestica</i>	G	—	—	Japanese fire bush—ornamental shrub with brilliant scarlet berries and dark green leaves. Excellent pot plant.
<i>Nauclea orientalis</i> PI 135002	F	—	—	Large tree with thick leaves; withstands salt spray. Beautiful when in flower.
<i>Nephrolepis exaltata</i>	G	—	—	Sword fern—ornamental fern 2 to 5 feet tall; very variable.
<i>Nerium oleander</i>	G	—	—	Oleander—mixed var. Shrub with showy flowers of single and double forms and many shades of color.
<i>Noronhia emarginata</i> L 87	F	—	—	Small tree with leathery oval leaves; fruit edible; grows well in sandy beach.
<i>Nothopanax cochleatum</i>	G	—	—	Large-leaf panax—shrub with large shiny foliage.
<i>Nothopanax Guilfoylei</i>	G	—	—	Round-leaf panax—shrub with round variegated shiny foliage suitable for pot and hedge plant.
<i>Nothopanax Guilfoylei aurea</i>	F	—	—	Golden panax—excellent hedge plant.
<i>Nothopanax</i> sp. 2522	G	—	—	Panax—excellent hedge plant.
<i>Ochna kirkii</i>	G	—	—	Shrub from eastern tropical Africa—flowers bright yellow; berries bright red.
<i>Ochroma lagopus</i>	E	—	—	Balsa — a quick-growing tree with large palmate leaves. Wood very light, used for floats and rafts.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Olea chrysophylla</i>	G	— —	— —	Small tree with leaves dark green above, drab underneath; may serve as good windbreak.
<i>Olea</i> sp. P 4604	E	— —	— —	Fruiting and reproducing naturally.
<i>Olea</i> sp. P 4810	G	— —	— —	Well-shaped trees with dark-green foliage, probably good for light windbreak.
<i>Olea</i> sp.	G	— —	— —	Well-shaped tree with dark-green foliage, probably good for light windbreak.
<i>Ormosia dasycarpa</i>	G	— —	— —	Necklace tree—large leguminous tree bearing red ornamental seeds with large angular black patch.
<i>Oroxylum indicum</i>	F	— —	— —	Ornamental small tree from tropical Asia; bark used for tanning and dyeing.
<i>Pandanus</i> sp. P 6189	G	— —	— —	Small thornless variety of <i>Pandanus</i> relative of our <i>puhala</i> .
<i>Pariti grande</i>	E	— —	— —	Malvaceous tree—making good growth.
<i>Parkia biglandulosa</i>	G	— —	— —	Handsome feathery foliage tree from Malaya.
<i>Parkia javanica</i>	F	— —	— —	Tree, native to Java.
<i>Parkia speciosa</i> 3688	G	— —	— —	Tall ornamental tree from Malaya.
<i>Parkia timoriana</i>	G	— —	— —	Nitta tree—very large tree with wide-spreading crown; leaves fern-like. Timor and Philippines.
<i>Paulownia imperialis</i>	—	G	— —	Tree from China, grown for its large attractive catalpa-like foliage and blue tubular flowers.
<i>Peltophorum ferrugineum</i>	G	— —	— —	Iyavaki—large quick-growing symmetrical tree with fine feathery foliage. Flowers yellow, attractive. Ceylon and Malaya.
<i>Pentacme contorta</i>	F	— —	— —	Tree belonging to the family Dipterocarpaceae. Tree resembles <i>Canarium</i> or pili nut tree.
<i>Persea borbonia</i>	G	— —	— —	Red Bay—handsome evergreen tree related to the avocado; up to 40 feet high; wood useful for cabinet and other purposes.
<i>Phacomeria speciosa</i>	G	— —	— —	Perennial herb grown for its foliage and flowers.
<i>Philadelphus coronarius</i>	F	— —	— —	Syringa—attractive bush with showy white fragrant flowers.
<i>Photinia arbutifolia</i>	— —	F	G	Toyon—shrub grown for its showy flowers and bright red berries. Used for Christmas decoration in California.
<i>Photinia villosa</i>	F	— —	— —	Photinia—upright shrub; foliage turns scarlet in fall; fruits bright scarlet.
<i>Phyllanthus distichus</i>	E	— —	— —	Otaheiti gooseberry—small tree with very acid fruit used for pickling and preserves. India and Malaya.
<i>Phyllanthus emblica</i>	G	— —	— —	Small tree with feathery foliage; round green flowers; kernel is made into a much esteemed preserve.
<i>Phyllostachys flexuosa</i>	F	— —	— —	Small bamboo—native to China.
<i>Phyllostachys quadrangularis</i>	G	— —	— —	Square bamboo—small bamboo with square stems.
<i>Picea engelmanni</i>	— —	— —	G	Engelman spruce—tree up to 150 feet with bluish-green foliage. Very ornamental tree; good timber tree.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Picea excelsa</i>	—	—	F	Norway spruce—tree up to 150 feet; branchlets pendulous. Extensively planted as ornamental tree. Good timber tree.
<i>Pinus insularis</i>	—	G	—	Pine from the Philippines.
<i>Pinus jeffreyi</i>	—	—	G	Jeffrey's pine—distinct and ornamental of symmetrical habit when young; tree up to 120 feet.
<i>Pinus murrayana</i>	—	P	G	Lodge-pole pine—variety of <i>Pinus contorta</i> but taller tree up to 80 feet.
<i>Pinus radiata</i>	—	G	E	Monterey pine—tree up to 100 feet. Valuable for seaside planting in the temperate zone.



Fig. 22. *Pinus murrayana* (lodgepole pine) at 8,000 feet in the Mauna Kea Reserve.



Fig. 23. *Pinus radiata* (Monterey pine). These trees are 7 years old and average 35 feet in height. Growing in the Honuaula Reserve at 5,000 feet elevation.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Pinus palustris</i>	—	G	—	Longleaf pine—very important timber tree of the Southern States; tree up to 100 feet; mats are manufactured from leaves.
<i>Pinus ponderosa</i>	—	P	E	Yellow pine—one of the most important pines of the Western States; tree 150 to 200 feet tall; important timber tree.
<i>Pinus sinensis yunnanensis</i>	—	G	—	Tree up to 70 feet; native to China.
<i>Pinus</i> sp.	—	P	G	Ornamental pine from Japan.
<i>Pitcarnia recurvata</i>	F	—	—	Billbergia-like, very short stemmed plant of ornamental value; leaves 2 feet long; native of Brazil.



Fig. 24. *Pinus sinensis yunnanensis* (Yunnan pine), 12 years old, and growing at 5,000 feet in the Hilo Reserve. This tree is producing fertile seed.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Pitcarnia wittei</i>	G	—	—	Very similar to the above.
<i>Pittosporum glabratum</i> 105620	F	—	—	Small tree with glossy dark leaves 3 to 5 inches long. Flowers yellow, fragrant; native to India and China.
<i>Pittosporum nigricans</i>	—	G	—	Small tree of symmetrical and compact growth; good for clipped hedges.
<i>Piscidia erythrina</i>	F	—	—	Fish poison tree—medium-sized tree, bark used as fish poison. Flowers small, dainty, white or lavender with ornamental pods.
<i>Platanus occidentalis</i>	—	G	—	Buttonwood—large tree up to 130 feet. Excellent street and park tree.
<i>Platanus orientalis</i>	G	—	—	Oriental plane tree—tree up to 80 feet; native to southeastern Europe to India. Much used as street and shade tree.
<i>Platycerium</i> sp.	G	—	—	Elk's horn fern — epiphytic fern of great beauty resembling elk's horn.
<i>Platymiscium stipulare</i>	G	—	—	Brazilian hardwood — leguminous tree from Brazil. Excellent wood.
<i>Plumbago capensis</i>	G	—	—	Plumbago—partially climbing or straggling plant with azure-blue or white phlox-like flowers.
<i>Plumeria acutifolia</i>	G	—	—	Plumeria — different varieties — tall shrub with yellow or white fragrant flowers often strung into leis.
<i>Plumeria acutifolia</i>	G	—	—	Pink flowers.
<i>Plumeria acutifolia</i>	F	—	—	Yellow flowers.
<i>Plumeria rubra</i>	G	—	—	Rosy-to-dark-red flowers, similar to <i>Plumeria acutifolia</i> .
<i>Podocarpus cupressina</i>	E	—	—	Large elegant, erect tree with small bipinnate leaves. Good timber; Java and Fiji.
<i>Podocarpus usambarensis</i>	G	—	—	Small tree with drooping branches. Leaves lanceolate, shiny, 5 inches long.
<i>Polyscias nodosa</i>	F+	—	—	Tree, native to Malaya belonging to the panax family.
<i>Populus maximowiczii</i>	F	—	—	Japanese poplar — very large tree up to 100 feet with attractive foliage and shapely head.
<i>Posoqueria latifolia</i>	G	—	—	Small tree of the Gardenia family with long tube-like fragrant flowers.
<i>Prunus</i> sp.	—	E	—	Red flowering Kofugen cherry; double flowering variety.
<i>Pseudotsuga taxifolia</i>	—	G	E	Douglas fir—pyramidal tree attaining 200 feet; timber tree of major importance.
<i>Pterocarpus marsupium</i>	F	—	—	Wide-spreading handsome tree; fine, dark, hard timber.
<i>Pterocarpus vidalianum</i>	G	—	—	Leguminous tree with dark-green foliage and somewhat drooping branches. Doing well and seeding.
<i>Putranjiva roxburghii</i>	G	—	—	Wild olive—moderate-sized tree with yellow flowers—India.
<i>Pyracantha angustifolia</i>	E	E	—	Narrow-leaf firethorn — thorny ornamental spreading shrub with orange-yellow berries. Good hedge plant.
<i>Pyracantha crenata serrata</i> FPI 72814	G	G	—	Spiny evergreen shrub from China. Leaves lustrous, dark green above and lighter beneath. Berries coral-red.

SPECIES	Location and			REMARKS
	1	2	3	
<i>Pyracantha crenulata</i>	G	G	—	Nepal firethorn—thorny shrub with shining leaves; berries, bright orange-red; good hedge plant.
<i>Pyracantha</i> sp. 1832	G	—	—	Firethorn—in seed and growing fairly well.
<i>Ravenala madagascariensis</i>	E	—	—	Traveler's tree—banana-like tree from Madagascar.
<i>Rhamnus californica</i>	—	—	P G	Coffee berry—evergreen shrub up to 15 feet. Ornamental fruit turning from red to purplish black.
<i>Rheedia edulis</i>	F	—	—	Small tree with rigid leathery leaves; fruit small, orange-yellow, edible, tasting somewhat like mangosteen.
<i>Rhododendron hybrida</i>	—	—	G —	Shrub with flowers resembling Azalea.
<i>Robinia pseudacacia</i>	—	—	G —	Black locust — ornamental deciduous tree with prickly branches; flowers white, very bright. Excellent hard wood.
<i>Rosa</i> sp. C 604	G	—	—	Red rose—thorny shrub with fragrant red flowers.
<i>Sageretia theezans</i>	F	—	—	Useful hedge plant with fragrant flowers.
<i>Samanea saman</i>	G	—	—	Monkey pod—large spreading tree affording excellent shade for livestock; pods eaten by cattle and horses.
<i>Sambucus</i> sp.	G	—	—	Tropical elderberry — tropical species of elderberry. Large head of white flowers.
<i>Sanchezia glaucophylla</i>	E	—	—	Excellent hedge plant with showy foliage variegated with pale yellow along the veins.
<i>Sandoricum koetjape</i>	G	—	—	Santol — beautiful tree with three-foliolate leaves. Large fruit, pulp surrounding seed, acid, edible.
<i>Sapindus saponaria</i>	F	G	—	Soapberry tree—indigenous to Hawaii.
<i>Sapium aucuparium</i>	G	—	—	Tree with milky sap resembling Ficus.
<i>Sapium sebiferum</i>	G	—	—	Chinese tallow trees—tree up to 40 feet; native to China and Japan. Ornamental tree used as shade tree.
<i>Saraca indica</i>	F	—	—	Sorrow-less tree — beautiful flowering tree with coral-red flowers. Bark used medicinally.
<i>Schizolobium excelsum</i>	G	—	—	Brazilian shower—tall tree from Brazil with very attractive golden yellow flowers in panicles.
<i>Sequoia gigantea</i>	—	—	F —	California big tree—most massive of all trees. Timber tree of great commercial value.
<i>Sequoia sempervirens</i>	F	G	—	California redwood—tallest tree in the world, wood red, soft, durable, straight-grained. Timber tree of great commercial value.
<i>Spathodea campanulata</i>	G	—	—	African tulip—tall erect tree from Africa. Flower large, tulip-shaped, brilliant orange-red.
<i>Spondias dulcis</i>	G	—	—	Wi apple—upright deciduous fruit tree with large yellow, stringy fruit pleasing to the taste.
<i>Spondias lutea</i>	G	—	—	Upright deciduous tree growing to 40 feet with glossy leaves; fruit yellow, edible.
<i>Sterculia apetala</i>	F	—	—	Small tree, flower yellowish-white with purple spots.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Sterculia acerifolium</i>	G	—	—	Australian flame tree—large timber tree in its native country. Flowers rich red.
<i>Sterospermum acerifolium</i>	G	—	—	Bignoniaceous tree with large maple-like leaves.

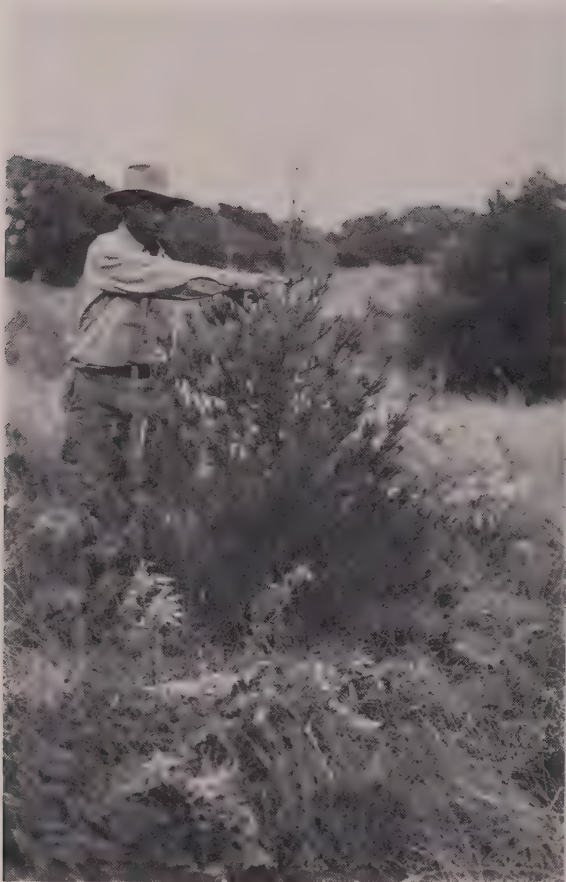


Fig. 25. *Sequoia gigantea* (giant redwood) growing at 5,300 feet in the Hilo Forest Reserve. This tree is only 4 years old.

<i>Strelitzia augusta</i>	G	—	—	White bird of paradise—banana-like plant, resembling travelers tree. Flowers used as cut flowers.
<i>Swietenia macrophylla</i>	G	—	—	Tall tree with straight bole; native to tropical America. Source of mahogany wood.
<i>Swietenia mahagoni</i>	F	—	—	Large tree with hard, dark, red wood of well-known value.
<i>Syringa vulgaris</i>	—	G	—	Lilac—upright shrub with showy flowers, lilac, blue, purplish or white in large panicles.
<i>Tabebuia chrysantha</i>	G	—	—	Evergreen flowering tree with yellow, funnel-form flowers in terminal dense racemes.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Tabebuia guayacan</i> PI 103937	F	— —	— —	Tall tropical tree, nearly 100 feet high. Handsome yellow flowers are 3 inches long; wood olive-brown, hard, used for making tool handles, boats, etc.
<i>Tamarindus indica</i>	G	— —	— —	Tamarind tree—moderate-sized, handsome evergreen tree. Fruit makes cooling beverage; wood hard, beautiful grain.
<i>Taxodium distichum</i>	F	— —	— —	Bald cypress—valuable timber tree, wood light and soft, straight-grained; durable in soil; swampy area.
<i>Taxodium mucronatum</i>	E	F	— —	Montezuma cypress—very slow-growing tree, good durable wood.
<i>Tecoma Donnell-Smithii</i>	G	— —	— —	Yellow jacaranda—tall tree, wood very valuable; beautiful golden-yellow flowers in abundance.
<i>Tecoma obtusa</i>	F	— —	— —	Small tree, not doing well.
<i>Tecoma pentaphylla</i>	E	— —	— —	Tree up to 60 feet with showy pink or white funnel-shaped flowers; spectacular when in bloom.
<i>Tecoma smithii</i>	G	— —	— —	Australian trumpet bush—upright ornamental shrub with bright yellow tubular-funnel-form flowers.
<i>Tecoma stans</i>	G	—	— —	Florida trumpet bush—upright shrub; yellow flowers. Similar to the above.
<i>Tectona grandis</i>	G	— —	— —	Teak—one of the most important timbers of the tropics. Native to Burma and Siam.
<i>Terminalia arjuna</i>	G	— —	— —	Arjuna—large tree indigenous to India. Bark is used in dyeing and tanning.
<i>Terminalia bellerica</i>	F	— —	— —	Very large tree; dried nuts employed in native medicines; kernel edible.
<i>Terminalia edulis</i>	G	— —	— —	Large forest tree; native to the Philippines; edible fruit.



Fig. 26. *Terminalia myriocarpa* and *Eucalyptus robusta*, Kohala Reserve, Land of Aamakao. Trees are about 15 years old.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Terminalia myriocarpa</i>	E	—	—	Jhalna—very large tree, leaves of which resemble that of guava. Good timber tree.
<i>Terminalia tomentosa</i>	G	—	—	Tropical almond—large deciduous tree. Timber tree of many uses.
<i>Tetrazygia bicolor</i>	G	—	—	Very vigorous shrub of ornamental value. Reproducing naturally.
<i>Theobroma cacao</i>	F	—	—	Cacao—small tree, native to tropical America. Source of chocolate.
<i>Thuja orientalis</i>	F	G	F	Small bushy tree of ornamental value.
<i>Thuja plicata</i>	P	G	—	Giant white cedar—tall tree up to 200 feet. Good timber tree.
<i>Thysanolaena maxima</i>	E	—	—	Tiger grass—large grass up to 12 feet with lanceolate leaves, suggestive of bamboo. Loves damp soil.
<i>Tournefortia argentea</i>	E	—	—	Tree heliotrope—small tree adapted to grow on the beach. Makes good low windbreak.
<i>Trema orientalis</i>	G	F	—	Gunpowder tree—large, fast-growing spreading tree, affording excellent shade. Wood makes good charcoal.
<i>Trichadenia philippinensis</i>	G	—	—	Small tree from the Philippines with long, dark-purple pecan-like fruit. Reproducing naturally.
<i>Triplaris americana</i>	F	—	—	Large tropical timber tree with beautiful red flowers and curious 3-angled woody fruit.
<i>Tristania conferta</i>	E	E	—	Brush box—handsome timber and shade tree from Australia, capable of withstanding dry, as well as wet climate; wood strong and durable.
<i>Trophis americana</i>	E	—	—	Tree from Central America belonging to the mulberry family. Leaves make excellent cattle feed.
<i>Ulmus americana</i>	—	G	—	American elm—tall and wide-spreading. One of the favorite avenue trees in the northern states.
Undetermined P 3198	G	—	—	Small tree doing fairly well.
Undetermined wet country tree P 4072	G	—	—	Tree found growing in very wet country, belonging to the olive family.
Undetermined 5447	E	—	—	Small, symmetrical tree with ornamental cherry-like red fruit.
<i>Vangueria edulis</i>	G	—	—	Voa Vanga—deciduous shrub with sweetish acid fruit—Madagascar.
<i>Vitex parviflora</i>	F	—	—	Medium-sized tree with very hard wood from the Philippines.
<i>Wallaceodendron celebicum</i>	F	—	—	Growing fairly well.
<i>Wigandia macrophylla</i>	G	—	—	Small tree with large foliage and blue flowers.
<i>Wormia burbigiei</i>	F	—	—	Shrub from Borneo with large bright-yellow flowers.
<i>Zingiber darceyi</i>	G	—	—	Variegated ginger—leaves variegated. Tubers are used for flavoring.
<i>Zingiber</i> sp.	G	—	—	Plants of the ginger family with showy flowers.
<i>Zoysia tenuifolia</i>	G	—	—	Locally known as the Japanese hair grass. Leaves thread-like and velvety.

PALMS

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Actinophloeus MacArthurii</i>	G	---	---	MacArthur's palm — soboliferous palm of great beauty.
<i>Adonidia merrillii</i>	G	---	---	Slender single-trunked palm with pinnate leaves, strongly arching.
<i>Aiphanes caryotifolia</i>	G	---	---	Palm similar in appearance to the wine palm, except that the stem and leaves are armed with long spines.
<i>Aiphanes lindeniana</i>	G	---	---	Ornamental spiny palm similar to the above with foliage somewhat like <i>Pinanga kuhlii</i> .
<i>Archontophoenix alexandrae</i>	G	---	---	Alexandra palm. Handsome pinnate-leaved palm, suitable for roadside planting.
<i>Archontophoenix cunninghamii</i>	G	---	---	Queensland Seaforthia — palm, native to Queensland, Australia, resembling the above.
<i>Arcea alicae</i>	G	---	---	Graceful, spineless palm with several stems from the same rhizome. Bright, shiny green leaves.
<i>Areca</i> sp. P 5884	G	---	---	Resembles the betel nut palm.
<i>Arecastrum romanzoffianum</i>	G	---	---	Romanzoffian palm—palm, native to Brazil, somewhat resembling <i>Cocos plumosa</i> , with pinnate, feathery arching foliage.
<i>Arenga saccharifera</i>	F	---	---	Sugar palm — large, handsome palm with leaves up to 25 feet long. Sap rich in sugar.
<i>Arenga</i> sp. 5659	G	---	---	Relative of the sugar palm.
<i>Arikuryroba schizophylla</i>	G	---	---	Small graceful monoecious feather palm of tropical Brazil.
<i>Bactris acanthophylla</i>	F	---	---	Very ornamental, slender-growing palm with cane-like stems.
<i>Bentinckia nicobarica</i>	F	---	---	Tall palm, 60 to 70 feet high with trunk 9 inches in diameter; ornamental.
<i>Borassus flabellifer</i>	G	---	---	Palmyra palm—tall palm attaining 100 feet in height and 2 to 3 feet in diameter. Leaves are palmately fan-shaped.
<i>Calamus muelleri</i>	F	---	---	Ornamental rattan-like palm; leaves have numerous hooks on midrib which assist the plant in climbing.
<i>Caryota rumphiana</i>	F	---	---	Tree up to 60 feet high with single stem. Leaves doubly pinnate, much more ornamental than the other species listed hereon.
<i>Caryota urens</i>	F	---	---	Similar to <i>Caryota mitis</i> but with a single stem (not soboliferous).
<i>Chamaedorea elegans</i>	G	---	---	Small ornamental palm with slender stem and pinnate leaf suitable for pot planting.
<i>Chamaedorea tepejilote</i>	F	---	---	Dwarf, ornamental pot palm.
<i>Chamaedorea</i> sp. 7043	F	---	---	" " " "
<i>Chrysalidocarpus lucubensis</i>	F	---	---	Tall and beautiful palm; native to Madagascar with a rather robust trunk; leaves pinnate.
<i>Chrysalidocarpus lutescens</i>	G	---	---	Spineless, stoloniferous feather palm, very ornamental.
<i>Coccothrinax acuminata</i>	G	---	---	Unarmed fan-palm of ornamental value.
<i>Coccothrinax argentea</i>	G	---	---	Cuban palm—unarmed slender fan-palm of great beauty.

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Cocos australis</i>	F	—	—	Pindo palm—palm up to 30 feet with erect stem. Outer pulp of fruit sweet, edible.
<i>Cocos datil</i>	F	—	—	Datil palm—pinnate-leaved palm from Argentina. Fruit resemble those of date palm, edible.
<i>Cocos nucifera</i>	E	—	—	Coconut—palm indigenous to Cocos or Keeling Islands. Fruits of commercial value; many varieties.
<i>Cocos nucifera</i> 1606	E	—	—	Samoa highland coconut.
<i>Cocos nucifera</i> P4131	F	—	—	Makapuno coconut from Philippine Islands.
<i>Cocos nucifera</i> P4612	G	—	—	Twin coconut.
<i>Cocos nucifera</i> P6403	G	—	—	Coco Nino; small tree.
<i>Cocos nucifera</i> P6405	G	—	—	San Ramon type; Pangasinon Province, Luzon, P. I.
<i>Cocos nucifera</i> P7367	G	—	—	Pugai coconut, Manila; dwarf type.
<i>Cocos romanzoffiana</i>	G	—	—	Palm native to Brazil, somewhat resembling <i>Cocos plumosa</i> , with pinnate feathery arching foliage.
<i>Cocos weddelliana</i> 5576	G	—	—	Small elegant palm, native to Brazil. Most suitable as potted plant.
<i>Coelococcus carolinensis</i>	G	—	—	Ivory nut palm—beautiful palm with large nuts, which is a source of commercial vegetable ivory.
<i>Copernicia cerifera</i>	F	—	—	Handsome palm—source of carnauba wax, exported from Brazil.
<i>Corypha umbraculifera</i>	F	—	—	Talipot palm—palm with stout, erect trunk 50 to 80 feet; immense leaves. Seeds ivory-like, made into buttons.
<i>Cryosophila warscewiczii</i>	G	—	—	Tall fan palm; native to tropical America; ornamental.
<i>Dictyosperma album</i>	G	—	—	Red palm—stately palm with a trunk 40 to 50 feet in height. When young, leaves are dark green with deep red margins and veins.
<i>Dypsis madagascariensis</i>	G	—	—	A rare species with small trunk and few leaves.
<i>Elaeis guineensis</i>	G	—	—	Oil palm—palm prized for the oil-bearing fruits and planted for ornament.
<i>Elaeis melanococca</i>	G	—	—	Palm from Colombia, related to the above.
<i>Erythea armata</i>	G	—	—	Blue fan palm—stout robust palm to 40 feet or more; leaves waxy blue in heavy crown; ornamental.
<i>Erythea brandegeei</i>	F	—	—	Tall palm with fan-shaped leaves, dark-green above and pale-glaucous underneath.
<i>Gaussia attenuata</i>	F	—	—	Tall feather palm from Puerto Rico.
<i>Hyophorbe amaricaulis</i>	F	—	—	Bottle palm—feather palm with stout trunk tapering to a bottle-like neck at the top.
<i>Hyophorbe verschaffelti</i>	F	—	—	Spindle palm—tree up to 30 feet, trunk bulging above the base or near the middle and tapering to the top.
<i>Hyophorbe</i> sp.	F	—	—	Palm similar and related to <i>Hyphaene crinita</i> .
<i>Kentia forsteriana</i>	F	—	—	Ornamental palm suitable for pot culture.
<i>Latania glaucophylla</i>	G	—	—	Stout fan palm; young plants have reddish-tinged leaves; ornamental.
<i>Latania verschaffelti</i>	G	—	—	Stout fan palm up to 40 feet; ornamental.

SPECIES	Location and			REMARKS
	1	2	Vigor 3	
<i>Licuala gracilis</i>	F	---	---	Small, bushy, 5 to 7 feet tall; native of Java.
<i>Licuala grandis</i>	F	---	---	Very elegant palm from the Pacific Islands. Leaves almost circular, pleated and fan-like.
<i>Licuala spinosa</i>	F	---	---	Palm up to 10 feet with several stems. Ornamental, good tub palm.
<i>Livistona chinensis</i>	G	---	---	Chinese fan palm—ornamental fan palm; native to China.
<i>Livistona decipiens</i>	G	---	---	Medium-sized palm with weeping leaves.
<i>Livistona rotundifolia</i>	G	---	---	Java fan palm—tall and slender palm up to 80 feet; ornamental.
<i>Livistona</i> sp. 621	G	---	---	Ornamental fan palm.
<i>Martinezia corallina</i>	F	---	---	Palm, strongly armed with long spines on leaves as well as trunk.
<i>Maximiliana maripa</i>	F	---	---	Palm from British Guiana; ornamental.
<i>Opsiandra maya</i> PI 124976	G	---	---	Graceful, feather palm up to 60 feet or more. Native to Guatemala.
<i>Phoenix canariensis</i>	G	---	---	Canary date palm—strong palm 50 to 60 feet with solitary straight trunk. Native to Canary Islands.
<i>Phoenix dactylifera</i>	G	—	---	Date palm—sub-tropical palm requiring arid conditions for successful growth. Source of commercial dates.
<i>Phoenix glauca</i>	G	---	---	Ornamental palm growing vigorously in our collection.
<i>Phoenix reclinata</i>	F	—	---	Stoloniferous palm, producing several stems in a close clump up to 20 feet or more.
<i>Phoenix roebelinii</i>	G	---	---	Roebelin palm — dwarf, handsome species with long, narrow arching leaves; a favorite for pots.
<i>Phoenix rupicola</i>	G	---	---	Indian sugar palm—palm up to 20 feet with slender and solitary trunk; graceful. India.
<i>Phoenix zeylanica</i>	G	---	---	One of the most beautiful and distinct of all the Phoenixes with the color of the Colorado blue spruce.
<i>Pinanga kuhlii</i>	G	---	---	Small palm with stoloniferous habit. Highly ornamental.
<i>Pritchardia affinis</i>	E	---	---	Rather tall, with large fan-shaped leaves. Native to the Hawaiian Islands.
<i>Pritchardia gaudichaudii</i>	G	---	---	<i>Loulu</i> palm—indigenous to the Hawaiian Islands. Leaves fan-shaped, used by the natives for making hats.
<i>Pritchardia hillebrandii</i>	G	—	---	Hillebrands palm.
<i>Pritchardia pacifica</i>	G	---	---	Fiji fan palm—fan palm of great beauty; native to Fiji.
<i>Pritchardia thurstoni</i>	G	-	---	Thurston fan palm.
<i>Ptychosperma angustifolia</i>	F	---	---	Narrow-leaved feather palm from New Guinea; ornamental.
<i>Ptychosperma elegans</i>	F	---	---	Rather slender feather palm with graceful curved leaves. Native to Australia.
<i>Ptychosperma</i> sp. 6516	G	---	---	Stoloniferous in habit.
<i>Ptychosperma</i> sp. 6909	G	---	---	Ornamental.
<i>Rhapis flabelliformis</i>	G	---	---	Rattan palm—small slender palm with numerous reed-like stems, used for walking sticks. Native to China.

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Rhapis</i> sp.	F	— —	— —	Ornamental palm similar and related to the above.
<i>Sabal adansonii</i>	F	— —	— —	Dwarf palmetto — fan-shaped, dwarf stemless palm.
<i>Sabal causiarum</i>	F	— —	— —	Puerto Rico hat palm—tall fan palm from Puerto Rico.
<i>Sabal guatemalensis</i>	F	— —	— —	Fan palm from Guatemala.
<i>Sabal mauritiaeformis</i>	G	—	— —	Savannah palm—fan palm 60 to 80 feet high with very large leaves.
<i>Sabal palmetto</i>	G	— —	— —	Carolina palmetto—palm 50 to 90 feet with fan-shaped leaves. Native to the U. S. along seacoast from North Carolina to Florida.
<i>Sabal umbraculifera</i>	G	— —	— —	Synonymous with <i>Sabal palmetto</i> .
<i>Sabal</i> sp. 795	G	— —	— —	Ornamental fan palm.
<i>Thrinax parviflora</i>	G	— —	— —	Fan palm 10 to 20 feet tall; well adapted for pot culture.
<i>Trithrinax acanthocoma</i>	F	— —	— —	Dwarf palm—spiny fan palm; ornamental.
Undetermined palm 428	F	— —	— —	Feather palm, probably <i>Chrysalidocarpus lucubensis</i> .
Undetermined dwarf palm L441	G	— —	— —	Ornamental dwarf palm.
Undetermined palm 3590	G	— —	— —	Fan palm, probably <i>Erythea brandegeei</i> .
Undetermined palm from Hilo Boarding School (5262)	G	— —	— —	Tall, stately palm with large, long, red seeds in clusters. Good avenue palm.
Undetermined house palm 6384	F	— —	— —	Ornamental palm adapted to pot culture.
Undetermined palm 7081	F	— —	— —	Palm from New Caledonia.

VINES

<i>Aganosma acuminata</i>	G	— —	— —	Vigorous woody vine with cream-colored, fragrant, jasmine-like flowers.
<i>Allamanda cathartica</i>	G	— —	— —	Yellow Allamanda—tall vigorous and free-flowering. Flowers large, yellow-orange.
<i>Anodendron paniculatum</i>	E	— —	— —	A very large and vigorous twiner with shiny green leaves.
<i>Antigonon insigne</i>	F	— —	— —	Large, bright, rose-pink double flowers.
<i>Antigonon leptopus</i>	G	— —	— —	Mexican creeper — pink, beautiful climber with light pink flowers.
<i>Antigonon leptopus</i> var. <i>alba</i> 7177 PI 130596	F	— —	— —	White flowering variety.
<i>Ardisia</i> sp. P 1	G	— —	— —	Hardy vine with shiny foliage.
<i>Ardisia</i> sp. 5648 P7956	G	— —	— —	One of the climbing Ardisias.
<i>Aristolochia gigantea</i> PI 119936	E	— —	— —	Swan flower—a tropical climber with very large flowers, purple-blotched and veined.
<i>Aristolochia leuconeura</i>	G	— —	— —	Twiner with large white-veined leaves; from Columbia. Foliage climber.
<i>Arrabidaea rotundata</i> PI 86521	G	— —	— —	Woody vine with large panicles of deep-rose flowers.
<i>Asparagus</i> sp.	G	— —	— —	Asparagus fern — vine from South Africa with handsome fern-like foliage.
<i>Bauhinia corymbosa</i>	E	— —	— —	Phanera—dainty vine with small foliage; flowers in long spray, pinkish-white and crepey.
<i>Bauhinia cumingiana</i> 5220	E	— —	— —	Vigorous vine with reddish-orange flowers.

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Bauhinia galpinii</i> PI 76776	E	—	—	Climbing shrub up to 10 feet; flowers brick-red, very showy.
<i>Bauhinia saigonensis</i> PI 129188	E	—	—	Vine very similar to <i>B. corymbosa</i> ; flowers fewer and not as attractive.
<i>Bauhinia scandens</i>	F	—	—	Small-leaved climber with white or yellow flowers. East India.
<i>Beaumontia grandiflora</i>	F	—	—	Beaumontia—vine with large, white, trumpet-shaped flowers.
<i>Bignonia grandiflora</i>	G	—	—	Large flower Bignonia — woody vine with large pink trumpet-shaped flowers.
<i>Bignonia jasminoides</i>	G	—	—	Jasmine-like Bignonia—Bignonia vine with Jasmine-like flowers.
<i>Bignonia unguis cati</i>	E	—	—	Bird's claw vine — creeping vine; flowers bright yellow; very handsome.
<i>Bignonia venusta</i>	G	—	—	Trumpet vine—bright orange flowers in clusters. Very showy when in full bloom.
<i>Bignonia violacea</i>	G	—	—	Bignonia from Bond; vine with attractive purple blossoms and good foliage.
<i>Bignonia</i> sp. 2383	G	—	—	Unidentified Bignonia vine — growing very well.
<i>Bignonia</i> sp. 6220	G	—	—	Garlic vine — flowers bluish-purple. Both flowers and leaves are scented like garlic.
<i>Bougainvillea praetoriensis</i>	G	—	—	Yellow Bougainvillea — woody vine with pinkish-orange bracts.
<i>Bougainvillea spectabilis</i>	F	—	—	Crimson lake Bougainvillea — woody vine with dark crimson bracts.
<i>Bougainvillea spectabilis</i> 4408	G	—	—	Pink Bougainvillea—woody vine with showy pink bracts.
<i>Bougainvillea spectabilis</i>	G	—	—	Brick-red Bougainvillea — woody vine with brick-red bracts.
<i>Chiococca racemosa</i>	F	—	—	Flowers yellowish-white; white ornamental fruits. Native of Florida and tropical America.
<i>Cissus</i> sp. P	G	—	—	Cissus vine — very strong vine with dark shiny leaves and small, deep-red, attractive flowers.
<i>Clematis</i> sp. from Pepeekeo 7576	G	—	—	This is probably <i>C. apiifolia</i> .
<i>Clematis</i> sp.	G	—	—	Very similar to <i>C. apiifolia</i> , probably the same species.
<i>Clerodendron thomsonae</i>	F	—	—	Bleeding heart climber—flowers white with scarlet projecting stigma. Tropical Africa.
<i>Clitoria ternatea</i>	E	—	—	Leguminous vine with large, blue, pretty flowers.
<i>Cryptostegia madagascariensis</i>	G	—	—	Madagascar rubber.
<i>Deguelia timoriensis</i> PI 116744	E	—	—	Strong woody climber with pale-rose flowers. East Indies.
<i>Derris elliptica</i> 8215	G	—	—	Large climber from India and Malaya. Cultivated for insecticidal purpose.
<i>Ficus repens</i>	E	—	—	Hug-me-tight vine — small-leaved, ivy-like creeper, good to cover stone and concrete walls.
<i>Hiptage</i> sp. PI 116513	F	—	—	A strong woody climber with opposite, entire, leathery leaves and racemes of small fragrant white flowers.

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Hoya carnosa</i>	F	---	---	Wax flower—pinkish wax-like flowers produced in bunches. Thrives best on tree trunks.
<i>Ipomoea horsfalliae</i>	G	---	---	<i>Kuhio</i> vine—vine with glossy dark-green leaves and dark reddish-magenta flowers produced in profusion.
<i>Ipomoea</i> sp. 690 and 920	G	---	---	Moonflower vine—vigorous vines suitable to cover high walls of stone.
<i>Jasminum azoricum</i> PI 97771	E	---	---	Azores jasmine—slender vine forming a mass of dark gray-green foliage and bearing long tubular fragrant white flowers. Berries are black.
<i>Jasminum pubescens</i>	F	---	---	Star jasmine.
<i>Jasminum tortuosum</i>	F	---	---	Climber grown for its fragrant flowers.
<i>Dolichos Lablab</i>	G	---	---	Strong climbing bean with purplish flowers. Stem and leaves also purplish.
<i>Jasminum</i> sp.	E	---	---	Lyon—jasmine—climber growing excellently.
<i>Lonicera hildebrandiana</i>	G	---	---	Giant honeysuckle—large flowering honeysuckle.
<i>Lonicera macrantha</i> PI 116874	F	---	---	Twinner with rather large white flowers, which fade to yellow.
<i>Lonicera</i> sp. 188	G	---	---	Honeysuckle—vines grown for their attractive foliage and fragrant flowers.
<i>Lonicera</i> sp.	G	---	---	Honeysuckle—vines grown for their attractive foliage and fragrant flowers.
<i>Monstera deliciosa</i>	G	---	---	Ceriman — climbing evergreen aroid with large ornamental perforated leaves. Fruit edible tasting somewhat like pineapple.
<i>Passiflora vitifolia</i>	G	---	---	Red passion vine—vine with very attractive, large, red flowers.
<i>Petrea volubilis</i>	E	---	---	Sandpaper vine—vine from tropical America with rough sandpaper-like leaves and attractive bluish racemes.
<i>Pithecoctenium cynanchoides</i> PI 128302	F	---	---	Woody vine climbing by tendrils on the leaves. Flowers large, pure-white, trumpet-like.
<i>Porana paniculata</i>	E	---	---	Large vigorous climber with long sprays of fragrant white flowers.
<i>Pothos aureus</i>	E	---	---	Golden Pothos—enormous epiphytic creeper with large oval leaves, blotched with yellow.
<i>Quisqualis</i> sp. 2790	G	---	---	Rangoon creeper—semi-climbing shrub with crimson flowers in drooping clusters.
<i>Schefflera</i> sp. PI 137990	G	---	---	Spectacular and beautiful woody climber bearing large sprays of small yellow fruits, which turn red, becoming black when mature.
<i>Solandra guttata</i>	E	---	---	Cup of gold—strong woody-vine with large cup-like yellow flowers.
<i>Solandra</i> sp. C1325	G	---	---	Cup of silver—very similar to the above, except that the flower is whitish.
<i>Stigmaphyllon ciliatum</i>	F	---	---	Slender twinner with bright yellow flowers, resembling an orchid.
<i>Stigmaphyllon</i> sp.	G	---	---	Amazon vine—University of Hawaii. Very similar to the above, especially the flowers.
<i>Strongylodon lucidum</i>	G	---	---	<i>Nukuwiwi</i> —climber with dark red, very attractive flowers. Indigenous to Hawaii.

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Syngonium podophyllum</i>	G	---	---	Variegated Aroid—creeper with ornamental foliage. The nerves on which are whitish.
var. <i>albo-lineatum</i>				
<i>Syngonium</i> sp. 2852	G	---	---	Creeper with ornamental foliage.
<i>Thunbergia grandiflora</i>	F	---	---	Clock vine—quick-growing, immense climber; flowers large, dark blue.
<i>Thunbergia grandiflora alba</i>	E	---	---	(Discarded) Bengal clock vine — a white flowering variety, synonymous with <i>T. grandiflora</i> .
<i>Triopteris jamaicensis</i> FPI 88138	F	---	---	Low-growing woody vine with purplish flowers.
<i>Tristellateia australiae</i>	G	---	---	Galphimia vine—flowering climber with yellow flowers in erect racemes; elegant and free bloomer.
Undetermined 428	E	---	---	Papua—in flower (small white), and growing very well.
Undetermined 2381	G	---	---	Growing well.
Undetermined 2853	G	---	---	Aroideae—epiphitic creeper; growing well.
Undetermined 2854	G	---	---	Aroideae—growing well.
Undetermined 2855	E	---	---	Aroideae—growing luxuriantly on the trunk of a silky oak tree.
Undetermined 2864	G	---	---	Aroideae—growing well.
Undetermined C451	E	---	---	Aroideae — epiphitic creeper; doing excellently.
Undetermined Thursday	F	---	---	Climber from Thursday Island.
<i>Vanilla planifolia</i>	G	---	---	Climbing orchid grown for the seed pods which yield vanilla of commerce.
<i>Ventilago madraspatana</i> PI 116762	G	---	---	Tropical climbing shrub with leathery feather-veined leaves and small greenish flowers in paniculate spikes.
<i>Wistaria multijuga</i>	G	---	---	Japanese Wistaria—flowers, violet or violet blue, also a white variety.
<i>Wistaria venusta</i>	F	---	---	Silky Wistaria—flowers very large, white.

Experimental Tree Planting (Species of Myrtaceae)

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Angophora lanceolata</i>	G	—	—	Large tree with smooth deciduous bark. Good timber.
<i>Angophora subvelutina</i>	G	—	—	Velvety gum myrtle — evergreen tree with white flowers; native to N.S.W. and Queensland.
<i>Barringtonia speciosa</i>	F	—	—	Wide-spreading tree with shining leaves. Good timber.
<i>Callistemon lanceolata</i>	G	—	—	Red bottle brush—shrub with attractive red bottle-brush-like flowers.
<i>Callistemon salignus</i>	G	—	—	Tree with papery bark resembling <i>Melaleuca</i> . Good forest tree.
<i>Eucalyptus acmenioides</i>	F	—	—	Tall, erect trees. Timber pale, useful for many purposes.



Fig. 27. Above: Typical cover in the Honuaula Reserve at 7,000 feet before planting. Below: Same general area as shown above. Several species of *Eucalypti* were planted 13 years ago and are now spreading naturally.

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Eucalyptus aggregata</i>	F	— —	— —	Small tree. Timber white, tough, not durable.
<i>Eucalyptus albens</i>	F	— —	— —	Medium-sized tree. Timber pale, very hard and very durable.
<i>Eucalyptus baileyana</i>	G	— —	— —	Medium-sized tree; timber light-colored, hard, interlocked and very tough.
<i>Eucalyptus baueriana</i>	F	— —	— —	Medium-sized tree; timber reddish, hard, durable.
<i>Eucalyptus blaxlandi</i>	— —	F	— —	Medium-sized, stringy bark; timber pale, of excellent quality.
<i>Eucalyptus bosistoana</i>	F	F	— —	Upright-growing tree; timber reddish-yellow, hard, durable.
<i>Eucalyptus botryoides</i>	G	— —	— —	Medium-to-large tree; timber red, durable.
<i>Eucalyptus calophylla</i>	F	— —	— —	Small-to-large tree. Mature wood pale-to-brown; strong and durable in ground.
<i>Eucalyptus camphora</i>	F	— —	— —	Medium-sized tree—thrives in swampy water-courses. Timber tough; leaves yield a rich, valuable oil.
<i>Eucalyptus cinerea</i>	— —	— —	F	Small-to-medium-sized tree grown for its valuable oil. Timber inferior—grows in poor soil.
<i>Eucalyptus citriodora</i>	G	— —	— —	Tall, stately tree; rich in lemon-scented essential oil. Timber pale, durable.
<i>Eucalyptus colossea</i>	G	— —	— —	Large tree, doing well.



Fig. 28. Mixed planting of several species of *Eucalypti* in the land of Honokaia, Hamakua Reserve. Trees are 9 years old.

<i>Eucalyptus coriacea</i>	F	— —	— —	Small tree—range 5000 to 6500 ft. elevation. Mature wood pale, fissile, often not very durable.
<i>Eucalyptus cornuta</i>	G	— —	— —	An ornamental medium-sized tree. Mature wood hard, heavy, interlocked, durable.
<i>Eucalyptus corymbosa</i>	F	F	— —	One of the bloodwoods — medium-sized-to-large tree. Timber reddish, durable underground.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Eucalyptus crebra</i>	F	—	—	Tall tree with drooping branches—timber red, hard and interlocked; prefers heavy soil.
<i>Eucalyptus dalrympiana</i>	F	F	E	Massive, white gum; timber pale, light, durable.
<i>Eucalyptus deanci</i>	G+	E	E	Large forest tree up to 200 feet. Timber red, durable.
<i>Eucalyptus drepanophylla</i>	F	—	—	Large tree, typical ironbark; timber red.
<i>Eucalyptus elaeophora</i>	F	—	—	Medium-to-large tree. Timber pale, inferior.
<i>Eucalyptus erythronema</i>	F+	—	—	Small crooked tree—an ornamental species for dry regions.
<i>Eucalyptus eugenioides</i>	G	—	—	Medium-sized, stringy bark; timber durable.
<i>Eucalyptus eximia</i>	F	—	F	Medium-sized tree; timber pale, hard, durable.
<i>Eucalyptus exserta</i>	F	—	—	Medium-sized tree; timber brownish, soft.
<i>Eucalyptus fastigata</i>	F	—	—	Tall tree, up to 200 feet with 6-8 feet diameter. Timber pale, fissile.
<i>Eucalyptus fleifolia</i>	F	—	—	Small decorative tree with very colorful red flower—numerous garden varieties.
<i>Eucalyptus frazinoides</i>	G	E	—	Tall, smooth-bark tree. Timber pale, fissile, inflammable when green.
<i>Eucalyptus gigantea</i>	D	—	E	Tall tree with straight tapering trunk. Timber pale, fissile.
<i>Eucalyptus globulus</i>	—	E	E	Blue gum. Timber pale, interlocked and hard.
<i>Eucalyptus goniocalyx</i>	F	E	E	Tall tree; timber pale, fissile.
<i>Eucalyptus grandis</i>	G	—	—	Tall, straight tree; timber red, strong, light and durable.
<i>Eucalyptus haemastoma</i>	F+	—	—	Small-to-medium-sized tree. Timber reddish and brittle.
<i>Eucalyptus hemiphloia</i>	F	—	—	Small-to-medium-sized tree, erect in habit. Timber pale, very hard and durable.
<i>Eucalyptus lehmanii</i>	G	—	—	Shrub or small tree; an ornamental species.
<i>Eucalyptus longifolia</i>	F+	—	—	Handsome large tree—timber deep red, durable.
<i>Eucalyptus MacArthurii</i>	G	—	—	Tall tree with a rounded head; timber pale, coarse in grain, moderately durable.
<i>Eucalyptus maculata</i>	G	—	—	Tall tree; timber pale, of good quality.
<i>Eucalyptus maculosa</i>	F	—	—	Medium-sized tree; timber red, brittle.
<i>Eucalyptus maideni</i>	G	G	E	Tall, somewhat like <i>E. globulus</i> . Timber pale, hard and durable. Thrives at a much higher altitude than <i>E. globulus</i> .
<i>Eucalyptus marginata</i>	F	—	—	Jarraih—large forest tree; timber red, of excellent quality.
<i>Eucalyptus melliodora</i>	F	—	—	Well-shaped medium-sized tree; timber pale, hard, durable.
<i>Eucalyptus microcarpa</i>	F	F	—	Medium-sized-to-large tree, rather erect in habit; timber very hard and durable.
<i>Eucalyptus microcorys</i>	G	E	—	Tallow wood—large tree; timber pale, hard, durable and one of the best.
<i>Eucalyptus mulleriana</i>	G	F	—	A large stringybark; timber pale, brown and durable.
<i>Eucalyptus nitens</i>	G	F	E	Large tree, 200-300 feet high with a diameter of 10 feet; tree very solid and yields very valuable milling timber.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Eucalyptus numerosa</i>	F+	—	—	Small slender tree; usually grows on the banks of rivers and on the edges of swampy land; strong and elastic timber when young.
<i>Eucalyptus obliqua</i>	F	D	—	A large tree; timber pale, tough, liable to warp.
<i>Eucalyptus paniculata</i>	F	P	—	Grey ironbark—creet tree, 40-80 feet high; timber pale pink-to-brownish, hard, interlocked, and one of the best.
<i>Eucalyptus patentinervis</i>	G	D	—	Medium-sized tree resembling <i>E. Robusta</i> , especially as a seedling.
<i>Eucalyptus pitularis</i>	E	—	—	Tall stately tree; timber pale, strong and durable.
<i>Eucalyptus piperita</i>	G	D	—	Medium-sized tree preferring cool, damp situations on well-drained soil. Timber pale, gummy, inferior.
<i>Eucalyptus polyanthemos</i>	F	P	—	Medium-sized scrambling tree with a short trunk—timber red, durable.
<i>Eucalyptus propinqua</i>	F+	—	—	Tall, straight grey gum; timber red, close-grained.



Fig. 29. Left: *Eucalyptus resinifera* (red mahogany) growing in the lower wet section of the Hilo Reserve — 20 years old. This species as well as others produces valuable timber. During the war years considerable Eucalyptus wood was sold on the local market and brought a good price. It has also been used to manufacture charcoal and certain species produce a very good grade, Right: *Eucalyptus saligna* (flooded gum) growing at 1,800 feet in the Hilo Reserve in very wet and sour soil. These trees are only 16 years old and average 133 feet in height.

SPECIES	Location 1	and 2	Vigor 3	REMARKS
<i>Eucalyptus punctata</i>	G	G	---	Typical grey gum. Timber tough, extremely durable, hard, close-grained, difficult to split. Has many uses.
<i>Eucalyptus quadrangulata</i>	F	---	---	Tall tree; timber pale, interlocked.
<i>Eucalyptus radiata</i>	F	---	D	Medium-to-large-sized tree. Timber useful for house carpentry, shipbuilding, rails, etc.
<i>Eucalyptus resinifera</i>	G	G	G	Large tree; timber red, durable, of excellent quality.
<i>Eucalyptus robusta</i>	E	---	---	Medium-to-large-sized tree; timber red, used for many purposes.
<i>Eucalyptus rostrata</i>	G	F	---	Red gum—large tree; timber highly prized for its durability in fresh or salt water and underground. Leaves yield a valuable volatile oil.



Fig. 30. Native Hawaiian *koa* in foreground planted from seed 19 years ago. In the background *Eucalyptus robusta* was planted 10 years ago. It will be noted that the introduced *Eucalyptus* has grown more rapidly than has the native *koa*. Manowaialee Reserve, elevation 4,200 feet.

<i>Eucalyptus rudis</i>	F	---	F	Medium-sized tree, often somewhat scrambling in habit; timber brown, worthless.
<i>Eucalyptus saligna</i>	E	E	---	Tall, straight-stemmed tree attaining a great height. One of the best timbers of Australia.
<i>Eucalyptus siderophloia</i>	F	F	---	Large tree; timber red, durable.
<i>Eucalyptus sideroxylon</i>	F	P	---	Ironbark tree—medium-sized tree; bark rich in Keno-tannin. Timber red and durable.
<i>Eucalyptus sieberiana</i>	F	---	P	Lofty tree. Reputed to stand snow, sleet and heavy frosts. Timber of superior quality, hard, tough, light and elastic.
<i>Eucalyptus smithii</i>	G	---	G	Tall tree; timber pale, hard and durable.
<i>Eucalyptus stewardii</i>	F+	---	---	Shrub, 4-10 feet high with lanceolate leaves.
<i>Eucalyptus stuartiana</i>	F	---	F	Large, often scrambling tree; timber pale pink, soft, brittle.
<i>Eucalyptus tereticornis</i>	G	G	---	Tall tree with thick trunk; timber red and durable.

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Eucalyptus umbra</i>	F	—	—	Small-to-medium-sized stringybark; timber pale and durable.
<i>Eucalyptus viminalis</i>	G	E	E	Large tree attaining great height. Timber pale, third-grade in durability.
<i>Eugenia brasiliensis</i>	F	—	—	Brazilian plum. Black edible fruit resembles cherry.
<i>Eugenia cumingii</i>	G	—	—	Tree resembling <i>E. jambolana</i> ; small purple fruit, somewhat bitter but edible.
<i>Eugenia curranii</i>	G	—	—	Tree from the Philippines with edible fruit the size of grape.
<i>Eugenia richii</i>	G	—	—	Large-leaf Eugenia. Edible fruit.



Fig. 31. *Eucalyptus viminalis* (Manna gum) growing in the Honuaula Reserve at 7,000 feet. These trees are only 15 years old and have an average height of 45 feet (note natural reproduction).

SPECIES	Location and Vigor			REMARKS
	1	2	3	
<i>Eugenia similis</i>	E	— — —	— — —	Ornamental tree with handsome foliage— young leaves, pinkish and very attractive; fruit dark purple and very acid.
<i>Leptospermum gracilis</i>	G	— — —	— — —	Tall shrub, with small leaves and white flowers.
<i>Leptospermum laevigatum</i>	F	— — —	— — —	Tall shrub attaining 20-30 feet. Native of Australia. Flowers white.
<i>Leptospermum scoparium</i>	F	— — —	— — —	Very ornamental shrub with bronzy foliage and beautiful white flowers.
<i>Melaleuca armillaris</i>	F	— — —	— — —	Drooping Melaleuca. Tall graceful shrub with drooping branches. White flowers.
<i>Melaleuca ericifolia</i>	F	— — —	— — —	Heath Melaleuca. Melaleuca with very small leaves.
<i>Melaleuca hypericifolia</i>	G	— — —	— — —	Dotted Melaleuca. Shrub with showy red flowers.
<i>Melaleuca leucadendron</i>	G	E	— —	Paper-bark tree. Good forest tree for wet and swampy areas.
<i>Melaleuca nesophylla</i>	F	— — —	— — —	Small tree with pink- or rose-colored flowers.
<i>Melaleuca styphetioides</i>	G	— — —	— — —	Prickly leaved Melaleuca. Tree with spongy bark and prickly leaves.
<i>Pimenta acris</i>	G	— — —	— — —	Bay rum tree. Small tree with shiny, very aromatic leaves from which the bay oil is extracted.
<i>Pimenta officinalis</i>	G	— — —	— — —	Allspice. Small ornamental tree — unripe dried berries are the source of allspice.
<i>Pimenta officinalis</i> var.	F	— — —	— — —	Variegated allspice. Same as above except variegated foliage.
<i>Syncarpia laurifolia</i>	G	E	— —	Turpentine tree. Good forest tree — wood very durable and takes a high polish.
<i>Tristania conferta</i>	G	E	— —	Brush box. Handsome timber and shade tree from Australia, capable of withstanding dry as well as wet climate. Wood strong and durable.

Experimental Fruit Orchards

KIND AND VARIETY	1	2	3	4	5	6	7	REMARKS
<i>APPLES</i>								
Baldwin	---	G	---	---	---	G	G	Heavy and steady bearer, good eating and excellent cooking. Excellent keeping; good appearance; pleasant flavor; firm texture; excellent shipping.
Baldwin, Dbl. Red	---	---	---	---	---	F	---	Excellent appearance. Fair eating; good keeping; good cooking.
Bellflower	---	---	---	---	---	G	---	Fair crop of fruit; not yet judged.
Black Ben	---	---	---	---	---	G	---	Firm, sprightly; fair eating. Good cooking; poor keeping.
Bugado	---	---	---	---	---	G	---	Medium-size; heavy crop.
Champion	---	---	---	---	---	G	---	Heavy crop of fruit last season. Fruit not yet judged.
Cortland	---	---	---	---	---	F	+	Poor eating; heavy crop. Fair cooking; good keeping.
Dark Red Staymared	---	---	---	---	---	G	---	Few fruits; not yet judged.
Delicious	---	---	---	---	---	G	G	Recent planting. Good growth.
Double Red Dutchess	---	---	---	---	---	F	---	Good cooking and eating. Medium-size; fair keeping; good appearance.
Early Harvest	---	---	---	---	---	G	---	Fruit for the first time; not yet judged.
Early McIntosh	---	---	---	---	---	F	---	Small size; good flavor. Fair keeping and crisp.
Early Red Bird	---	---	---	---	---	F	---	Heavy crop; small size. Good flavor, sweet. Excellent appearance and eating. Fair cooking.
	---	---	---	---	---	F	---	Small fruit of very attractive red color; strong but of pleasing acid flavor; crispy flesh.

<i>Location</i>		<i>Vigor</i>	
1	Hilo (Elevation 30 feet — 272 varieties)	E	Excellent
2	Kapulena (Elevation 2250 feet — 173 varieties)	G	Good
3	Waiakea (Elevation 375 feet — 133 varieties)	F	Fair
4	Makapala (Elevation 1600 feet — 106 varieties)	P	Poor
5	Kawaihae (Elevation 12 feet — 15 varieties)	D	Dead
6	Keanakolu (Elevation 5400 feet — 221 varieties)		
7	Nauhi Gulch (Elevation 5100 feet — 78 varieties)		

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
Famuse Snow	—	—	—	—	—	F	—	Fairgrowth. Few fruits; not yet judged.
Giant Genfon	—	—	—	—	—	G	—	Firm, mild, small size. Good eating and cooking; good keeping.
Golden Delicious	—	—	—	—	—	G	—	Excellent flavor; firm and juicy. Good cooking, eating and keeping.
Gravenstein	—	—	—	—	—	G	G	Fair size; good eating; flavor slightly on the acid side.
Grimes Golden Dbl. Life	—	—	—	—	—	G	—	Beautiful appearance. Excellent eating and cooking. Fair keeping.
Henry Clay	—	—	—	—	—	G	—	Good appearance. Poor keeping. Flavor fair.
Imperial Rambo	—	—	—	—	—	G	—	Large, tart, crisp, juicy fruit; yellow and dull red.
Jeffers Red	—	—	—	—	—	G	—	Fair flavor; fair eating. Good cooking.
Jon-a-Red	—	—	—	—	—	G	—	Recent planting; good growth.
Jonathan	—	—	—	—	—	G	G	Good eating and cooking. Good keeping; firm, sweet; green and red color; medium-size.
Liveland Raspberry	—	—	—	—	—	F	—	Fair growth; few fruits; not yet judged.
Maiden Blush	—	—	—	—	—	F +	—	Excellent appearance; good eating and cooking. Poor keeping.
Mam. Blk. Twig Improved	—	—	—	—	—	G	—	Fair eating; poor cooking. Fair keeping; color green and dull red. Fair texture.
McIntosh Red	—	—	—	—	—	G	—	Excellent flavor; tender. Medium-size; good appearance.
Northern Spy	—	—	—	—	—	G	—	Good growth; not fruiting.
N. W. Greening	—	—	—	—	—	F +	—	Good color; firm, mild. Medium-size.
Paragon Femmons	—	—	—	—	—	F +	—	Poor eating; poor keeping. Good cooking; medium-size.
Red Astrachan	—	—	—	—	—	G	G	Excellent eating. One of the best. Medium-size. Poor keeping.
Red Rome Beauty	—	—	—	—	—	F	—	Small; poor eating. Good cooking; poor keeping.
Rhode Island Greening	—	—	—	—	—	G	G	Fair eating; good cooking and good keeping. Fair- and medium-size.
Scarlet Staynared	—	—	—	—	—	G	—	Recent planting. Good growth.
Senator	—	—	—	—	—	G	—	Excellent flavor, tart, crisp. Excellent eating and good cooking, good keeping; medium-size.
Stark Delicious	—	—	—	—	—	G	—	Good growth, few fruits; not yet judged.
Stark Florence Crabapple	—	—	—	—	—	G	—	Attractive, small, red, crispy, acid, slightly bitter.
Stark Gold Crabapple	—	—	—	—	—	G	—	Few fruits; not yet judged.
Stark King David	—	—	—	—	—	G	—	Good growth. Fruiting; fruit not yet judged.

KIND AND VARIETY	1	LOCATION AND VIGOR				7	REMARKS
		2	3	4	5	6	
Starking	—	—	—	—	—	G	Small-size; good eating. Excellent cooking. Fair keeping. Firm, sweet, mild.
Stayman Winesap	—	—	—	—	—	G	Fair eating; poor cooking. Poor keeping. Medium-size. Mild flavor
Staynared	—	—	—	—	—	G	Good flavor; poor keeping. Medium-size.
Summer Champion	—	—	—	—	—	G	Color red and yellow. Excellent mild flavor. Good eating and cooking; fair keeping; medium-size.
Sweet Baugh	—	—	—	—	—	F	Mealy texture; mild flavor. Fair keeping; fair eating. Poor cooking.
Transcendent Crabapple	—	—	—	—	—	G	Small, attractive, yellow-red. Pleasing acid flavor; crispy flesh; slightly bitter; very prolific.
Unknown No. 1	—	—	—	—	—	G	Fair, acid flavor; firm flesh. Small; fair color.
Unknown No. 2	—	—	—	—	—	G	Fair flavor. Spongy flesh. Good for applesauce.
Unknown No. 3 Apple from Old Orchard	—	—	—	—	—	G	Good growth; not fruiting.
Unknown No. 4 Apple from Old Orchard	—	—	—	—	—	G	Good growth; not fruiting.
Valmore	—	F +	—	F	—	F	Fair growth; not yet fruiting.
Wealthy	—	—	—	—	—	F	Firm fruit; tart flavor. Fair keeping; medium-size.
White Pearmain	—	—	—	—	—	G	Good color; firm, crisp. Mild flavor; good eating; medium-size.
Willow Twig Dbl. Red	—	—	—	—	—	F	Tender, bright red, sweet; good eating. Fair cooking; poor keeping.
Wilson Red June	—	—	—	—	—	G	Fruiting; fruit not judged.
Winesap	—	—	—	—	—	G	Few fruits; not yet judged.
Winter Banana	—	—	—	—	—	G	Good color; mild excellent flavor; good keeping; good eating and cooking. Excellent appearance; very prolific.
Yellow Bellflower	—	—	—	—	—	G	Fair size; good eating.
Yellow Newton Pippin	—	—	—	—	—	G	Excellent eating and good cooking. Fair keeping; large size; tart flavor.
Yellow Transparent	—	—	—	—	—	P +	Not doing very well.
York Imperial	—	—	—	—	—	F	Fair growth; few fruits; not yet judged.
<i>Malus</i> sp. 30229	—	F	—	—	—	—	Helm apple. Apple for warm climate. Fruit large, flesh tender, juicy and sweet.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
<i>APRICOT</i>								
Royal	—	—	—	—	—	G	—	Young tree, not of fruiting age.
<i>AVOCADOS</i>								
Abel	F	—	F	D	—	—	—	Fruit not sampled.
Adaehi (Fall)	F	—	—	—	—	—	—	" " "
Aiken-Haiku	—	—	F	—	—	—	—	" " "
Akbal	F	—	—	—	—	—	—	Young tree, not of fruiting age.
Akoi	P +	—	—	G	—	—	—	
Areia (Summer)	F	—	—	—	—	—	—	Fruit not sampled.
Atlixico	G	—	G +	—	—	—	—	" "
Austin (Winter)	G	—	—	—	—	—	—	Late fall to early winter; medium-size-to-large; flesh, creamy color, rich, somewhat dry; fair flavor.
Baird	G	—	—	—	—	—	—	Fruit not sampled.
Beardslee	D	G	—	D	—	—	—	" " "
Benedict	F	F	—	—	—	—	—	" " "
Benik	F	F	—	—	—	—	—	Fruit of good quality.
Bon	F	—	—	—	—	—	—	Fruit not sampled.
Booth	F	—	F	—	—	—	—	" " "
Brandt (Summer)	G	—	—	D	—	—	—	" " "
Cantel	G	—	—	—	—	—	—	Tree not of fruiting age.
Clark	F	—	—	—	—	—	—	Young tree, not of fruiting age.
Cockett	F	—	—	—	—	—	—	Fruit not sampled.
Costa	G	—	—	—	—	—	—	" " "
Dickey	G	—	—	D	—	—	—	" " "
Dr. Lyon's Late	G	—	—	D	—	—	—	" " "
Dranga	G	—	F	—	—	—	—	Fall; extra large; flesh thick, smooth, fiber-free, not too rich; good flavor.
Duke	F	P	—	—	—	—	—	Fruit not sampled.
Early Summer Pink Flesh	F +	—	—	—	—	—	—	Young tree, not of fruiting age.
Edranol	F	—	—	—	—	—	—	Fruit not sampled. Heavy bearer.
Elizabeth White	G	—	—	—	—	—	—	Young tree, not of fruiting age.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
Esbank	G	—	—	—	—	—	—	Late summer; large; flesh thick, not too rich, good flavor, prolific.
Fairchild	F +	—	D	—	—	—	—	Late summer to early fall. Large; flesh medium-thick, not too rich, slightly fibrous; good flavor.
Florida	F —	G	F	—	—	—	—	Late summer to early fall. Medium-size. Thick flesh, fiber-free, smooth, not too rich; very good flavor.
From Y. M.	—	—	—	G	—	—	—	Late fall; medium-size; thin flesh, fiber-free; flavor rather poor.
Fuente	G	—	D	D	—	—	—	Fruit not sampled.
Green, Large, Smooth	—	—	F	—	—	—	—	" " "
Haley	G	G	—	—	—	—	—	Late fall; large; thick flesh; good flavor; prolific.
Haley Late	G	F	G	D	—	—	—	Fruit not sampled.
Haiku	—	—	—	G	—	—	—	Late fall to early winter; medium-size to large; flesh, fiber-free, not too rich; medium flavor.
Haiku No. 20	—	—	—	G	—	—	—	Fruit not sampled.
Hulunanu	F	G	—	D	—	—	—	Fruit not sampled; reported as good fruit.
Ichijo, Early Winter	F	—	—	D	—	—	—	Fruit not sampled.
Iliahu	F	—	F	D	—	—	—	Late fall; medium-size; good flavor; fiber-free. Medium bearer.
Ishum	P	P +	G	—	—	—	—	Late fall; medium-size; flesh fairly thick, slightly fibrous, not too rich; good flavor.
Iskal	G	—	P +	—	—	—	—	Good fruit.
Itsumna	F	G	D	D	—	—	—	Fruit not sampled.
Judge Kalua	G	—	—	D	—	—	—	Late summer; large; flesh thick, watery; poor flavor.
Kaguah	G	G	G	D	—	—	—	Late fall; extra large; thick flesh, fiber-free, not too rich; very good flavor.
Kalama	G	—	—	—	—	—	—	Young tree, not of fruiting age.
Keau-99 yr. Old	F	—	G	—	—	—	—	Fruit not sampled; reported as good fruit.
Late Summer	—	—	G	—	—	—	—	Fruit not sampled.
Leucadia	F	G	—	—	—	—	—	Late fall; small; flesh, smooth, creamy; good flavor. Good bearer.
Linda	G	G	P +	D	—	—	—	Fruit not sampled.
Lula	F	—	—	—	—	—	—	Late fall to early winter; thick cream-colored flesh; good flavor; slightly fibrous.
MacDonald	G	—	—	D	—	—	—	Fruit not sampled.



Fig. 32. A grafted avocado (Ryan) in our fruit orchard at the Hilo Nursery. We maintain a number of these experimental orchards where many different varieties of fruit trees are under trial.



Fig. 33. Zahadi date in fruit. This tree produced over 100 pounds of excellent dates. We have five varieties of dates growing at Kawaihāe near sea level where there is little rainfall and plenty of heat. These palms are apparently able to live on brackish water.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
Winter from Kauai	G	---	---	---	---	---	---	Young tree, not of fruiting age.
Wishard	---	---	F	---	---	---	---	Fruit not sampled.
BLUEBERRIES								
Concord	---	---	---	---	---	F +	D	Small, blue, <i>ohelo</i> -like fruit of good flavor.
Grover	---	---	---	---	---	F	D	Fruiting at the time of inspection but not matured enough to describe.
Harding	---	P	---	---	---	G	F	Fruiting at the time of inspection but not matured enough to describe.
Jersey	---	---	---	---	---	F	P	Fruiting at the time of inspection but not matured enough to describe.
Kathrine	---	---	---	---	---	F	E	Fruiting at the time of inspection but not matured enough to describe.
Pioneer	---	---	---	---	---	G	G	Fruiting at the time of inspection but not matured enough to describe.
Ranicoeus	---	D	---	---	---	P +	F	Not at fruiting stage.
Rubel	---	D	---	---	---	F	G	Fruit, the size of <i>ohelo</i> , deep blue and good flavor.
Seedling	---	---	---	---	---	---	G +	Fruiting at the time of inspection but not matured enough to describe.
BREADFruits								
<i>Artocarpus</i> sp. 1819	G	P	---	---	---	---	---	Fruit, smaller than the common Hawaiian breadfruit; with seeds; pulp as well as seeds are edible.
Hawaiian	G +	---	---	---	---	---	---	Similar to the Samoan variety.
Samoan	F	---	G	---	---	---	---	Medium-size; good eating cooked.
BUTTERNUT								
<i>Juglans cinerea</i> 192 (seedling)	---	---	---	---	---	---	G	Tree not of fruiting age.
CACAO								
Seedling	F	---	---	---	---	---	---	Source of chocolate.
CARAMBOLA								
Averhoa (seedling)	G +	---	---	---	---	---	---	Fruit angular; very juicy; makes good jelly and preserves and a pleasing drink.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
<i>Castanea mollissima</i> seedling 22000B		G	—	—	—	F	—	Young tree, not of fruiting age.
<i>Castanea mollissima</i> seedling 26031B		G	—	—	—	—	—	" " " " " "
<i>Castanea mollissima</i>			—	—	—	G	—	" " " " " "
DR33 T34 26029D			—	—	—	—	—	" " " " " "
<i>Castanea mollissima</i>			—	—	—	G	—	" " " " " "
DR34 T39 26031D		—	G +	—	—	—	—	Bearing few burs for the first time.
<i>Castanea pumila crenata</i> seedling 25137B			—	—	—	—	—	Young tree, not of fruiting age.
<i>Castanea pumila crenata</i> seedling 251378			—	—	—	G	—	Produces burs but no fruit.
<i>Castanea</i> sp. (Japanese)			—	—	—	—	G +	Burs noted at the time of inspection but not matured enough to describe.
Italian			—	—	—	—	G	Fruited in 1941 at Keanakolu; good fruit.
<i>Marron combale</i>			—	—	—	—	G	Flowering, with both male and female flowers present.
<i>Marron querey</i>			—	—	—	—	—	
COCONUTS								
Coco-nut	G	—	—	—	P	—	—	Dwarf variety; fruit small but good eating; from Philippine Islands.
San Ramon	G	—	—	—	P	—	—	Very large fruit; good eating; from Philippine Islands.
CUSTARD APPLES								
<i>Annona reticulata</i> seedling	F	—	—	—	—	—	—	Fruit sweet and delicious. Belongs to the soursoop family.
DATES								
Doglet Noor			—	—	E	—	—	Excellent, large, good eating fruit.
Hulawy			—	—	F	—	—	Excellent, large, good eating fruit.
Khadrawi			—	—	G	—	—	Excellent, large, good eating fruit.
Seedling			—	—	G	—	—	Fruit not sampled.
Zahadi			—	—	G	—	—	Excellent, large, good eating fruit.
DEWBERRY								
Cardona	—	—	—	—	—	G	E	Fruit of fair quality.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
EGG FRUIT <i>Lucuma vireica</i>								
<i>EUGENIA CUMINGII</i> Seedling	G							Yellow fruit with orange flesh that resembles the yolk of a hen's egg.
<i>EUGENIA CURRANII</i> Seedling	G							Fruit, small, purple, resembles and tastes like Java plum.
<i>EUGENIA</i> SP. From A. Judd 7250	P +	F						Tree not of fruiting age.
<i>FLGS</i> Beall	P	G						Young tree, not of fruiting age.
Brunswick	P	F						Not fruiting.
Celeste	G							Fruit not sampled.
From Eklund	F							Small pinkish fruit; very good flavor.
From Forbes	G							Fruit not sampled.
From Peepeekeo	G							Fruit fair.
Kadola	F							Large, well flavored fruit; very prolific.
Mission	G							Small yellowish fruit; very sweet and good flavor.
Partridge Eye	G	G						Fruit not sampled.
Peepeekeo Purple	F							" " "
<i>FILBERT</i> Barcelona				P		G		Flowered for the first time.
<i>FRENCH CHERRY</i> Seedling	G							Good-flavored fruit; makes good jelly and jam.
<i>GOOSEBERRY</i> Ceylon	G							Fruit round, dark purple; makes good jelly or jam.
Oregon Champion						F +		Young plant, not of fruiting age.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
<i>GRAPES</i>								
Beacon	—	E	P	+	P	—	—	Bears heavily; fruit not sampled.
Black Mission	—	F	P	+	D	—	G	Not fruiting.
Concord	—	P	P	D	—	—	G	Fruits at Nauhí Orchard but has never been noted to mature.
Dattier	—	G	—	—	—	—	—	Not as yet fruiting.
Eden	—	F	G	+	G	—	—	Fruit not sampled.
Flowers	—	G	+	P	E	—	—	" "
Golden Muscat	—	G	+	P	P	—	—	Ranger reports this variety to be excellent eating.
James	—	G	—	P	E	—	—	Fruit not sampled.
Lady Finger	—	G	+	—	—	—	—	Not as yet fruiting.
Niagara	—	G	P	D	—	—	F	White grape; good flavor; will bear in our climate.
Scuppernong	—	G	—	E	—	—	—	Fruit not sampled.
Thomas	—	E	P	E	—	—	—	Fruit not sampled.
Thompson Seedless	—	—	—	—	—	—	G	Not as yet fruiting.
<i>GRAPEFRUITS</i>								
Duncan	P	+	F	+	F	G	—	Medium-to-large; juicy; good flavor.
Foster	F	+	F	G	E	—	—	Large; flesh pinkish; very juicy; good flavor. One of the best.
March Seedless	F	G	G	F	+	—	—	Medium-size; seedless; good flavor.
McCarty	G	F	G	—	—	—	—	Excellent flavor.
Thompson	P	+	G	—	P	—	—	Good fruit; very juicy.
Triumph	F	—	F	G	—	G	—	Good fruit; very juicy.
Wainaku	F	G	G	F	+	—	—	Large, juicy, well-flavored.
<i>GUAVA</i>								
White	G	—	—	—	—	—	—	Medium-size; sweet; good flavor.
<i>KUMQUATS</i>								
Marumi	D	G	G	—	—	—	—	Small, round, thin-skinned, acid fruit; makes fine marmalade.
Meiwa	G	—	G	G	—	—	—	Excellent fruit; very sweet.
Nagami	F	+	F	—	G	—	—	Similar to Marumi but the fruit is elongated.
Unknown	G	—	—	—	—	—	—	Young tree, not of fruiting age.

KIND AND VARIETY

1 2 3 4 5 6 7

REMARKS

LEMONS

From Elmore	P	+	G	P	+	P	—	—	—	Probably Meyer lemon; excellent fruit.
From Keau	—	—	F	+	—	—	—	—	—	Fruit not sampled.
From Martines	—	—	G	—	—	—	—	—	—	" " "
Lisbon	G	+	G	—	G	—	—	—	—	Good fruit; not a heavy producer.
Meyer	G	+	G	—	G	—	—	—	—	Fair-size, thin-skinned, good color; very juicy; pleasing acid flavor. Very prolific.
Pink Fleshed	F	—	G	—	—	—	—	—	—	Medium-size; variegated; thin-skinned; pink flesh of pleasing acid flavor.
Ponderosa	G	—	G	—	—	—	—	—	—	Novelty fruit; very large and ornamental. Fair juice lemon.
Rough Skin	G	—	—	—	—	—	—	—	—	Large; thick-skinned; good citrus stock. Good juice lemon.
Villa Franca	G	—	G	—	—	—	—	—	—	Large fruit; prolific. Excellent fruit.
Volcano House	F	—	G	—	—	P	—	—	—	Large; good bearer.

LIMES

Bearss Seedless	G	—	F	+	—	—	—	—	—	Medium-size; good color; very juicy; seedless; pleasing acid flavor; prolific.
Kusaie	G	—	G	—	—	G	—	—	—	Small; thin-skinned; juicy; pleasant flavor. Very prolific.
Lakeland	F	—	—	—	—	—	—	—	—	Fruit not sampled.
Mexican	G	—	G	—	D	G	—	—	—	Small; very thin-skinned; very juicy; pleasing acid flavor plus good aroma.
Otaheite	G	—	G	—	—	—	—	—	—	Medium-size; thin-skinned; sweet but flat flavor; juicy; ornamental.
Rangpur	G	—	G	—	—	G	—	—	—	Medium-size; skin and flesh tangerine-colored; very juicy; good acid flavor.
Sweet	G	—	G	—	—	F	—	—	—	Medium-size; sweet; good flavor; sweetness and acidity, well blended.
LIMEQUAT										
Eustis	F	—	G	—	—	—	—	—	—	Small; thin-skinned; juicy; acid flavor; similar to lime.

KIND AND VARIETY	1	2	3	4	5	6	7	REMARKS
<i>LITCHI</i>								
Chun Hoon	G	—	—	—	—	—	—	Young tree, not of fruiting age.
From Elks Club	G	—	—	—	—	—	—	Young tree, not of fruiting age.
From Maneki	G	—	—	—	—	—	—	Young tree, not of fruiting age.
From Reeds Island	G	—	—	—	—	—	—	Very good variety.
From Takafuji	G	—	—	—	—	—	—	Young tree, not of fruiting age.
No-Mi Chee	G	—	—	—	—	—	—	Young tree, not of fruiting age.
Qui-Mi Chee	G	—	—	—	—	—	—	Young tree, not of fruiting age.
<i>LOGANBERRY</i>								
Thornless	—	—	—	—	—	F	D	Young plant, not of fruiting age.
<i>LONGAN</i>								
From Robert Pahau	F	—	—	—	—	—	—	Young tree, not of fruiting age.
Seedling	G	—	F	—	—	—	—	Fruit smaller than litchi; flesh sweet; much prized in China.
<i>LOQUATS</i>								
From Martines	—	G	—	—	—	—	—	Delicious flavor; makes excellent jelly.
Large	G	—	—	—	—	—	—	Delicious flavor; makes excellent jelly.
Seedling	G	—	—	—	—	—	—	Delicious flavor; makes excellent jelly.
Shipman No. 1	—	G	—	—	—	—	—	Delicious flavor; makes excellent jelly.
Shipman No. 2	—	G	—	—	—	—	—	Delicious flavor; makes excellent jelly.
<i>MABOLO</i>								
Seedling	G	—	—	—	—	—	—	Pinkish, velvet fruit, the size of an apple; pulp white, edible; has a peculiar odor.
<i>MACADAMIA NUTS</i>								
From T. White	F +	—	—	—	—	—	—	Medium-sized nuts; fair bearer.
Haw. Agr. Exp. Sta. 10	F	—	—	—	—	—	—	Young tree, not of fruiting age; supposedly good variety.
36-246	G	—	—	—	—	—	—	"
36-282	G	—	—	—	—	—	—	"
36-333	F	—	—	—	—	—	—	"

KIND AND VARIETY	1	2	3	4	5	6	7	REMARKS
36-386	G	—	—	—	—	—	—	Young tree, not of fruiting age; supposedly good variety.
36-425	G	—	—	—	—	—	—	"
36-429	G	—	—	—	—	—	—	"
36-462	G +	—	—	—	—	—	—	"
36-551	G	—	—	—	—	—	—	"
Seedling	G	G	—	—	—	—	—	Good parentage; nuts on some of the trees are large and very well-flavored.
<i>MAMMEE APPLE</i>								
Seedling	G	—	—	—	—	—	—	Fruit 3 to 6 inches in diameter; brown-to-russet-colored skin; pulp yellow, sweet and aromatic. Tastes like dry papaya; very good preserved.
<i>MANDARINS</i>								
From Glenn St. Mary Nursery	F	G	G	F	—	—	—	Medium-size; thin-skinned; poor quality; not juicy as grown in Hilo.
Kara	G	—	F	—	—	—	—	Fruit not sampled.
King	F	F	G	P	—	—	—	Fair size; thick skin but easy peeling; good flavor.
Kinnow	F	F	F	—	—	—	—	Fruit not sampled.
Ponkan	—	—	G	F	G	—	—	Excellent fruit.
Wilking	G	—	F	G	—	—	—	Medium-size; very thin easy peeling skin; good color; pleasant flavor.
Willow Leaf	F	G	G	P	—	—	—	Excellent fruit of good flavor.
<i>MANGOES</i>								
Adam Pali	G	—	—	—	—	—	—	Tree not of fruiting age.
Cambodiana	G	—	—	—	D	—	—	Medium-size; good flavor; fruits well in Hilo.
Carabao	F	—	—	—	D	—	—	Young tree, not of fruiting age.
Cowasjee-Patel	F	—	—	—	—	—	—	Tree not of fruiting age.
Fairchild	G	—	—	—	—	—	—	Young tree, not of fruiting age.
From George Watt	G	—	—	—	—	—	—	Tree not of fruiting age.
From R. Bryan	F	—	—	—	—	—	—	Young tree, not of fruiting age.
Haden	G	—	—	—	D	—	—	Large; highly colored; firm flesh; well-flavored; good shipper.

KIND AND VARIETY	1	2	3	4	5	6	7	REMARKS
Kinney	G	---	---	---	---	---	---	Medium-size; excellent flavor; fiber-free.
Mulgotha	G	---	---	---	---	---	---	Tree not of fruiting age.
Pirie	G	---	---	---	---	---	---	Large; good flavor; not suited to Hilo climate.
Sandeshaw	F	---	---	---	---	---	---	Young tree, not of fruiting age.
Schobank	G	---	---	---	---	---	---	Tree not of fruiting age.
Victoria	F +	---	---	---	---	---	---	"
<i>MANGOSTEENS</i>								
Seedling	---	F	---	G	D	---	---	Young tree, not of fruiting age.
Seedling 6498	G	---	---	---	---	---	---	"
Seedling P 6586	G	---	---	---	---	---	---	"
Seedling P 6844	G	---	---	---	---	---	---	"
<i>MIMUSOPS ELENGI</i>								
Seedling	G	---	---	---	---	---	---	Fruit yellow, the size and shape of a small olive; pulp dry and mealy.
<i>MULBERRIES</i>								
From Hilo Nursery Grounds..	G	---	---	---	---	---	---	Good-flavored fruit; makes excellent jam. Very prolific.
From George Fuller	F	---	---	---	---	---	---	Good-flavored fruit; makes excellent jam.
From Wailuku River Bank	G	---	---	---	---	---	---	Good-flavored fruit; makes excellent jam.
Small Leaf 7549	---	G	---	---	---	---	---	Young tree, not of fruiting age.
Weeping	G	---	---	---	---	---	---	Good-flavored fruit; makes excellent jam.
<i>NECTARINES</i>								
<i>A. persica nectarina</i> 43142	---	---	---	---	---	---	G	Fruiting at the time of inspection but not matured enough to describe.
Blood	---	---	---	---	---	---	G	Tree not of fruiting age.
Boston	---	---	---	---	---	---	G	Fruiting at the time of inspection but not matured enough to describe.
Flaming Gold	---	---	---	---	---	---	G	Good flavor.
Gower	---	---	---	D	---	F	---	Tree not of fruiting age.

KIND AND VARIETY

1 LOCATION AND VIGOR 2 3 4 5 6 7 REMARKS

OLIVES

Ascolano	---	---	---	P	---	G	} Source of commercial olives and olive oil. Flowers and young fruits were heretofore observed on some of these trees but no mature fruit has been noted.
Barouni	---	---	---	G	---	D	
Manzanillo	---	---	---	P	---	F	
Mission	---	---	---	G	---	G	
Servillano	---	---	---	P	---	F	
Unknown	---	---	---	---	---	G	Variety unknown.

ORANGES

Carter Navel	F	F	---	---	---	---	Young tree, not of fruiting age.
Chamouth	G	F	---	G	---	---	Fruit good.
Hamlin	G	G	G	G	---	---	Medium-size; good flavor.
Lue Gin Gong	G	G	G	P	---	---	Fruit not sampled.
Mediterranean Sweet	F	G	D	F	---	---	Medium-size fruit of fair quality.
Parson Brown	G	F	+	G	---	---	Fruit good, sweet.
Pineapple	F	G	P	+	---	---	Medium-size; good flavor.
Robertson Navel	G	G	P	+	G	---	Fruit not sampled.
St. Michael	D	F	P	+	---	---	Fruit not sampled.
Seedless Valencia	F	G	P	+	---	---	Fruit not sampled.
Seedling	G	+	G	G	---	---	Seedless variety; similar to the seed variety in size and flavor.
Temple	D	F	F	---	---	---	Small-to-medium size; well-flavored juicy fruit of the Valencia type.
Valencia	G	G	G	G	---	---	Good fruit.
Washington Navel	G	F	G	F	---	---	Medium-size; very juicy; well-flavored; good for orange juice.
							Large; sweet; juicy in flavor. It is not excelled by any other orange.

PEACHES

Ainabou	---	G	---	---	---	---	Small fruit; fair eating.
Anga. persica 55813	---	F	---	---	---	---	Peach from the Plant Introduction garden, Chico, Calif. Reported to be good.
Angel	---	G	---	---	---	G	Fruit small; good flavor.
Australian Sauer	---	G	---	P	---	F	Fruiting at the time of inspection but not matured enough to describe.
C. O. Smith	---	G	---	P	---	P	Fruit not sampled.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
Dorothy	—	F	—	—	—	F	—	Fruited; unobserved.
Florida	P	—	—	P	—	G	—	Small fruit; fair eating.
Florida Gem	—	P	+	—	—	F	—	Fruit sweet but somewhat bitter.
Golden Blush	—	F	—	P	—	P	+	Not doing very well.
Hall's Yellow	—	G	—	—	—	F	—	Fruited; unobserved.
Jewel	—	F	+	—	—	F	—	Fruit good flavor.
Lukens Honey	—	P	+	P	—	F	—	Small fruit; fair flavor.
New Zealand	F	+	F	—	—	—	—	Not fruited.
Seedling	—	—	—	—	—	G	—	Fair-sized fruit; fair eating.
Taber	—	G	—	—	—	P	—	Growing poorly.
Waldo	—	F	+	—	—	F	—	Fruit small, very sweet and good flavor.
<i>PEARS</i>								
Anjou	—	—	—	—	—	G	—	Small fruit; sweet, somewhat watery flavor.
Bartlett	—	G	—	—	—	G	G	Large fruit; very good flavor; flesh not too gritty.
Beurre Bosc	—	—	—	—	—	G	G	Small fruit; good flavor.
Beurre D'Anjou	—	—	—	—	—	G	G	Young tree, not yet fruiting.
Dutchess	—	—	—	—	—	G	—	Young tree, not yet fruiting.
Fane	—	—	—	—	—	F	—	Fruiting at the time of inspection but not matured enough to describe.
Flemish Beauty	—	—	—	—	—	G	F	"
Kieffer	—	—	—	—	—	G	G	"
Lincoln (Standard)	—	—	—	—	—	G	—	"
Mellbenny	F	—	—	—	—	G	—	Young tree, not of fruiting age.
P. Barry's	—	—	—	—	—	G	G	Scanty fruiter.
Seckel	—	—	—	—	—	G	G	Very small roundish fruit; good flavor.
Stark Seckel	—	—	—	—	—	G	—	Small fruit; good flavor.
Stark Tyson	—	—	—	—	—	G	—	Young tree, not of fruiting age.
Wilder's Early	—	—	—	—	—	—	G	Medium-sized, sugary fruit; good eating.
Winter Bartlett	—	—	—	—	—	—	G	Fruiting at the time of inspection but not matured enough to describe.
Winter Nellis	—	—	—	—	—	G	G	"



Fig. 34. Meyer lemon in fruit growing in the Hilo Nursery Orchard. We have under trial many varieties of citrus fruits in our different orchards.



Fig. 35. Methley plum in fruit. This is one of the most outstanding of a large number of varieties of fruit trees with which we have experimented. It does well at elevations between 4,000 and 7,000 feet.

KIND AND VARIETY	LOCATION AND VIGOR							REMARKS
	1	2	3	4	5	6	7	
PECANS								
Burkett	—	—	—	—	—	—	F	Young tree, not of fruiting age.
Caloro	—	G +	—	—	—	P	—	"
Hicoria, pecan seedling	—	—	—	—	—	F +	—	Young tree, not of fruiting age.
Mahan	—	G +	—	—	—	F	D	"
Masterpiece	—	G	—	—	—	F	—	"
Moncymaker	—	G	—	—	—	D	—	"
Nellis	—	G	—	—	—	—	—	Young tree, not of fruiting age.
Schley	—	P +	—	—	—	G	—	Young tree, not of fruiting age.
Seedling	—	—	—	—	—	G	—	"
Stuart	—	G	—	—	—	F	—	"
Success	—	—	—	—	—	F +	—	"
PERSIMMONS								
Diospyros lotus	—	D	—	—	—	G	—	Young tree, not of fruiting age.
Diospyros virginiana	—	—	—	—	—	F	—	Young tree, not of fruiting age.
Diospyros sp.	—	G	—	—	—	—	—	Not of fruiting age.
Fuyugaki	—	G	—	—	—	—	—	Not of fruiting age.
Galley	—	G +	—	P	—	—	—	Fruit not sampled; very promising in appearance.
Seedling	—	—	—	—	—	G	—	Young tree, not of fruiting age.
PILI NUT								
Canarium lucanicum	G	—	—	—	—	—	—	Tree not yet fruiting.
PINEAPPLE GUAVAS								
Choiteana	G	G	—	—	—	—	—	Fruit not sampled.
Sellowiana	G +	—	—	—	—	—	—	Fruit the size of a small hen's egg; good eating; delightful aroma.
Superba	G	G	—	—	—	—	—	Fruit not sampled.
PISTACHIOS								
Chinensis	—	—	—	—	—	G	—	Young tree, not of fruiting age.
Kaz	—	—	—	—	—	F	—	Young tree, not of fruiting age.

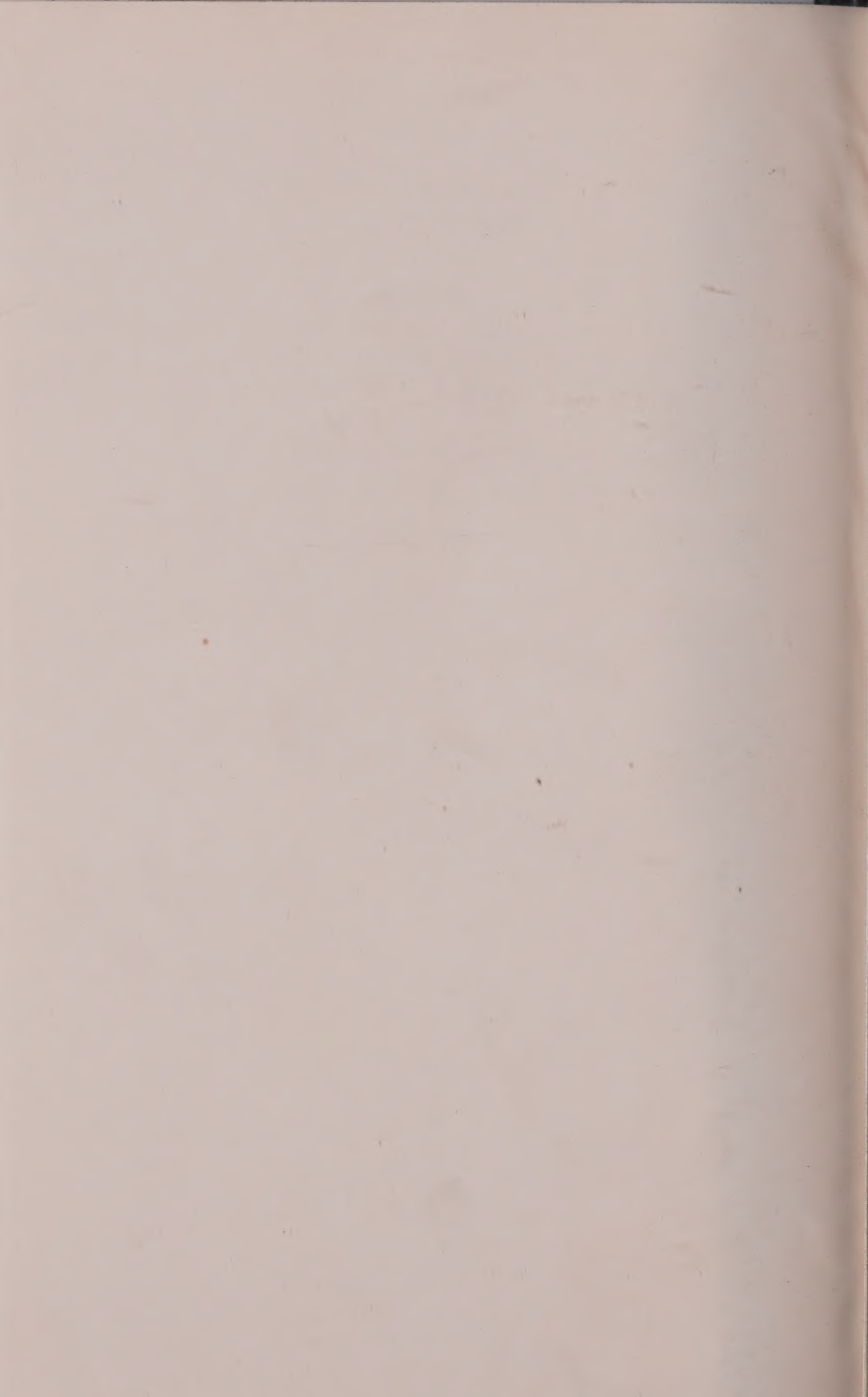
PLUMS									
Alpha 43176	—	—	—	—	—	G	G	Large, attractive red fruit; yellow flesh; fair flavor. Good for canning. Fairly prolific.	
Best Hybrid 43182	—	—	—	—	—	G	G	Yellow plum; fair-size; good eating.	
Early Gold Shiro	—	—	—	—	—	G	—	Fruiting at the time of inspection but not matured enough to describe.	
Flaming Delicious Golden	—	—	—	—	—	G	—	Tree not yet fruiting.	
	—	—	—	—	—	G	—	One fruit noted at the time of inspection but not matured enough to describe.	
Great Yellow	—	—	—	—	—	G	—	Good-sized fruit; reddish-yellow; good eating.	
Honeymoon	—	—	—	—	—	G	—	Tree not yet fruiting.	
Indian Blood	—	—	—	—	—	G	—	Large fruit; excellent flavor.	
Japanese 76202	—	G	—	—	—	G	G +	Very large fruit; good eating when fully ripe.	
June Blood	—	—	—	—	—	G	—	Tree not yet fruiting.	
Late Goose	—	—	—	—	—	G	—	Fruit of good flavor.	
Mammoth Cardinal	—	—	—	—	—	G	—	Tree not yet fruiting.	
Methley SPI 31652	—	—	—	G	—	E	E	Excellent bearer; fruit dark-red; small-to-medium size; excellent quality; very prolific.	
Omaha	—	—	—	—	—	G	—	Tree not yet fruiting.	
Purple Flame	—	—	—	—	—	G	—	"	
Red Ace	—	—	—	—	—	G	—	Fruit small; yellow; good flavor.	
Santa Rosa	—	—	—	—	—	G	—	Tree not yet fruiting.	
Sharp's Early 43178	—	—	—	—	—	G	G	Medium-sized fruit; good flavor; yellow flesh and red skin.	
Stark Green Gage	—	—	—	—	—	F	—	Tree not yet fruiting.	
PRUNES									
Golden Sugar	—	—	—	—	—	G	—	Tree not yet fruiting.	
Grand Prize	—	—	—	—	—	G	—	"	
QUINCE									
Chinese 37954	—	—	—	—	—	—	G	Large fruit with good aroma.	
<i>Cydonia oblonga</i>	—	—	—	—	—	F	G	Yellow, bitter-acid fruit with good aroma; makes good preserve.	

KIND AND VARIETY	1	2	3	4	5	6	7	REMARKS
<i>STAR APPLE</i>								
Seedling	G	—	—	—	—	—	—	Fruit round, 2 to 3 inches in diameter. Agreeable taste when fully ripe.
<i>STRAWBERRY TREES</i>								
<i>Arbutus unedo</i>	G	G	—	—	—	—	—	Fruit not sampled.
<i>SYNSEPALUM DULCIFICUM</i>								
From D. T. Fleming	G	—	—	—	—	—	—	Novelty fruit.
<i>TANGELOS</i>								
Orlando	G	G	—	—	—	—	—	Fair.
Sampson	G	G	G	G	—	—	—	Golden-yellow; thin-skinned; delicious orange-colored juice; excellent juice fruit.
San Jacinto	P + G	—	F	E	—	—	—	Good juice fruit.
Thornton	—	G	G	—	—	—	—	Good fruit.
Wekiwa	P	G	F	P	—	—	—	Fruit not sampled.
<i>TANGERINES</i>								
Algerian	F	—	G	F + G	—	—	—	Small-to-medium-size; skin thin and easy to peel; good flavor.
Dancy	F	G	G	G	—	—	—	Medium-size; good color; thin skin, easy peeling; good eating quality.
Ponkan	F	G	—	D	—	—	—	Fruit not sampled.
Satsuma	F	F	—	G	—	—	—	Small-to-medium-size; thin skin, easy peeling; very juicy; good flavor.
Satsuma Ovari	G	F	D	F	—	—	—	Fruit not sampled.
Unknown	—	—	F	—	—	—	—	Fruit not sampled.
Wase Satsuma	F	F	G	G	—	—	—	Small-to-medium-size; easy peeling skin; fair quality.
<i>VI APPLE</i>								
Seedling	G +	—	—	—	—	—	—	Golden yellow, medium-sized fruit; sub acid; deliciously flavored; fibrous covering of the seed embeds the pulp which makes it stringy.

Sugar Prices

96° CENTRIFUGALS FOR THE PERIOD
SEPTEMBER 16, 1946, TO DECEMBER 15, 1946

Date	Per pound	Per ton
September 16, 1946—September 17, 1946	4.205¢	\$ 84.10
September 18, 1946—November 19, 1946	5.575¢	111.50
November 20, 1946—December 15, 1946	5.94 ¢	118.80



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